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RECENT PUBLIC HEALTH WORK IN THE UNITED STATES ESPECIALLY IN RELATION TO INFANT MORTALITY.

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THE great deterrents to progress of public health work in this country have been political influence or control over public health officials; and ignorance of the people, and therefore the government, in the economic value of life and health. This becomes apparent in the study of public hygiene, and is shown conclusively by the comparison of results in various communities, both in this country and abroad, and especially in relation to the infant welfare movement.

The latter is shown most conclusively by the history of our own national government. Our statesmen, not appreciating Lord Beaconsfield's well-known saying "that public health is the foundation on which rests the happiness of the people and the power of the country; the care of the public health is the first duty of the statesman," have conserved our forests, our mineral resources, our lands, our streams, and our animals. "But man, for whom all these should be conserved, is for the most part neglected, or left for the last consideration." Commercialism is still in the ascendant, as is shown by the millions annually appropriated by the national government for the protection of crops and animals, owing to their commercial value, compared with the paltry thousands appropriated for conservation of health and life of man, whose monetary value is not considered. Yet, it has been demonstrated by Professor Irving Fisher and others that in the United States approximately 3,000,000 people are constantly sick, at least one third of whom are in the working period of life. Allowing for the non-employment of one quarter of these, and assuming the average annual earnings to be $700, we find over $500,000,000 to be the minimum loss of wages, in addition to which the cost of medical attendance and nursing must be added; an annual loss to the nation of great magnitude. This same policy holds true in our municipalities. Appropriations for city improvements, protection of property, and development of ports in seaport cities, are large, for such development increases trade and adds to the commercial

standing of the city, while far more important from an economic view is the prevention of sickness and mortality, especially of the wage-earner. Yet, as the commercial value of health and life is not fully realized, appropriations to municipal health departments are exceedingly small.

Notwithstanding this attitude, great progress has been made in sanitary science, more particularly in European countries, where health work has come, largely, under national control and is free from local political conditions. It is a rare thing today to find in most continental cities a health officer who has not had special collegiate training for his work. The colleges in this country are not to blame, as many have already instituted courses, and confer degrees of "Doctor of Public Health" and "Doctor of Public Hygiene"; but our young men will not give years for their proper education for positions of this character, the tenure of which depends not upon efficiency, but upon political influence. This is the condition in the majority of our cities, although, happily, there are numerous exceptions.

The remedy for this evil lies in the organization of a national bureau or department of health, under whose general control all appointments should be made through civil service, to be terminated only by malfeasance in office, inefficiency, resignation, or death. Coöperation and aid of the national authorities would soon educate the community to abandon any local legislation that would not be in conformance with such organization. "In diseases which can travel from state to state, in diseases which can jeopardize the welfare of a commonwealth as a whole, state lines should not be considered." Municipal, county and state boards of health are phases in the development of a perfected whole, and should always exist, but hold the same relation to a national department of health that our cities, counties, and states do to our national government.

The many separate government bureaus now engaged in independent health work should be consolidated and coördinated in this national department of health, and have at least the authority over public health that the Inter-State Commerce Commission has over commerce. "Control of inter-state stream pollution would markedly decrease typhoid fever, control of quarantine and inter-state common carriers would remove a menace to the health of the travelling public. The coalition of investigation and coöperation with the many unrelated biological and pathological, federal, state, and private laboratories, would prove of inestimable value." These are but a few illustrations advanced as an argument for the creation of such a national department.

The Twelfth Census (1900) showed in some cities an annual death-rate in children under five years of age of over 100 per thousand of population. The fact that many of these deaths were preventable attracted attention, especially as the largest proportion of this mortality was in ages under one year, 25 per cent. of which were from diarrhea and enteritis, largely preventable.

This great and needless mortality, constituting over 30 per cent. of the total deaths of the United States, attracted public attention, and it was therefore in the early part of the present century that the first concentrated efforts were made to conserve child life. The following tables are presented as a means of comparing results in our larger cities.

TABLE 1.

DEATHS UNDER ONE YEAR OF AGE.

Cities.	Average number of deaths of infants under 1 year of age per 100 deaths from all causes.			Per cent. change.	
	1901 to 1905.	1906 to 1910.	1911 to 1913.	1906 to '10 from 1901 to '05.	1911 to '13 from 1906 to '10.
Atlanta	19.38	17.56	15.40	− 9.39	−12.30
Baltimore	22.58	21.38	19.06	− 5.32	−10.85
Boston	20.20	20.68	18.57	+ 2.38	−10.20
Buffalo	22.68	24.06	22.00	+ 6.08	− 8.56
Chicago	20.10	21.12	19.50	+ 5.07	− 7.67
Cincinnati	14.94	14.66	12.00	− 1.87	−18.14
Cleveland	25.02	25.14	22.00	+ 0.48	−12.49
Denver	13.38	13.34	12.20	− 0.30	− 8.55
Detroit	25.76	27.98	25.90	+ 8.62	− 7.43
Indianapolis	17.38	14.66	12.37	−15.65	−15.62
Jersey City	22.22	22.01	20.14	− 0.95	− 8.49
Kansas City, Mo.	16.42	16.40	15.40	− 0.12	− 6.10
Los Angeles	9.60	11.50	10.77	+19.79	− 6.35
Louisville	16.50	14.10	12.27	−14.55	−12.98
Milwaukee	26.08	26.62	25.50	+ 2.07	− 4.21
Minneapolis	14.86	15.72	15.90	+ 5.79	+ 1.15
New Haven	20.02	18.66	17.23	− 6.79	− 7.66
New Orleans	16.22	15.78	13.13	− 2.71	−16.79
New York	21.78	21.78	19.33	0.0	−11.24
Newark	20.60	21.10	19.73	+ 2.43	− 6.49
Philadelphia	18.98	20.44	17.73	+ 7.69	−13.25
Pittsburgh	24.14	24.26	21.20	+ 0.49	−12.61
Providence	21.42	21.36	18.13	− 0.28	−15.12
Richmond	20.72	20.26	19.27	− 2.22	− 4.88
Rochester	12.62	13.90	15.40	+10.32	+10.79
St. Louis	16.86	16.44	14.03	− 2.49	−14.66
St. Paul	21.70	19.58	18.43	− 9.77	− 5.88
San Francisco	12.30	12.16	9.83	− 1.14	−19.16
Seattle	15.14	14.94	12.43	− 1.32	−16.80
Toledo	16.70	16.62	15.53	− 0.47	− 6.56
Washington	19.38	17.66	14.43	− 8.87	−18.29

The figures in Table No. 1, although those most employed, are not absolutely fair for comparative purposes, as cities vary greatly in their per cent. of population at this age period.

birth registration, which in some places is far from satisfactory, it being estimated in one of our large cities that less than 50 per cent. of all births are recorded.

TABLE 2.

DEATHS OF INFANTS UNDER ONE YEAR OF AGE PER 1,000 BIRTHS.

Cities.	1900.	1910.	1912.	1914.
Atlanta	258.8	213	—	—
Baltimore	208.5	218	177.7	154.6
*Boston	173.0	126	119.0	103.4
*Buffalo	137.0	162	127	121.5
Chicago	134.0	281	—	132.7
*Cincinnati	155.3	131	103	—
Cleveland	163.6	150	137	118.4
Denver	146.6	163	—	—
*Detroit	176.5	179	132	122.4
*Indianapolis	153.7	123	101.5	102.2
Jersey City	175.6	204	149.8	105.1
*Kansas City, Mo.	165.1	154	166.8	—
Louisville	155.6	145	108	—
*Milwaukee	167.6	145	—	—
Minneapolis	95.2	109	72.4	82.7
New Orleans	197.9	162	102.3	112.2
*New York	170.5	125	105.3	94.4
*Newark	164.0	124	—	—
*Philadelphia	178.0	138	102.4	117.6
*Pittsburgh	162.1	150	126.7	115.2
*Providence	190.2	144	112.7	112.7
*St. Louis	146.3	115	97.3	103.4
St. Paul	91.2	132	96.1	79.5
San Francisco	136.2	108	100	—
Washington, D. C.	232.7	152	128	—

*" Cities where the reported number of births exceeded the population under one year of age by 10 per cent or more, and, therefore, the ratio of infantile mortality given is probably approximately correct."

The figures for 1900 and 1910 are taken from the United States Census reports. The figures for 1912 and 1914 are obtained from local health officers.

Table No. 2, showing the per cent. of deaths under one year of age to each thousand births, would be the fairer method, if it did not depend upon the completeness of

The relation of mortality to the number living at the same age, therefore, seems to be the fairest method of comparison with the means we have at our disposal, and is shown in Table No. 3.

TABLE 3.

DEATHS UNDER ONE YEAR OF AGE.

Cities.	Average per cent. of deaths to those living.			Per cent. change.	
	1901 to 1905.	1906 to 1910.	1911 to 1913.	1906 to '10 from 1901 to '05.	1911 to '13 from 1906 to '10.
Baltimore	22.36	22.18	19.73	− .8	−11.05
Boston	17.26	17.81	15.82	+ 3.18	−11.17
Buffalo	15.10	17.63	16.07	+16.76	− 8.85
Chicago	12.72	13.97	13.07	+ 9.82	− 6.44
Cincinnati	15.92	15.58	12.7	− 2.14	−18.49
Cleveland	15.81	14.65	12.37	− 7.34	−15.57
Denver	14.18	14.67	11.07	+ 3.46	−24.54
Detroit	15.73	18.33	18.33	+16.53	0.0
Indianapolis	15.48	13.48	11.53	−12.92	−14.46
Jersey City	17.65	16.70	13.03	− 5.38	−21.97
Kansas City, Mo.	15.76	15.26	15.22	− 3.17	− 0.26
Louisville	17.07	14.31	12.33	−16.17	−13.84
Milwaukee	14.22	16.32	15.80	+14.77	− 3.19
Minneapolis	7.90	9.54	10.07	+20.76	+ 5.56
New Haven	15.38	14.42	12.57	− 6.24	−12.83
New Orleans	17.53	16.98	13.20	− 3.14	−22.26
New York	16.65	15.68	12.50	− 5.83	−20.28
Newark	15.06	14.66	11.80	− 2.66	−19.51
Philadelphia	16.04	17.10	13.37	+ 6.61	−21.81
Pittsburgh	18.25	17.32	13.80	− 5.10	−20.32
Providence	19.24	17.83	13.30	− 7.33	−25.41
Richmond	21.82	20.26	18.23	− 7.15	−10.02
*Rochester	9.42	10.85	12.30	+15.18	+13.37
St. Louis	15.44	13.90	12.00	− 9.97	−13.67
St. Paul	11.13	12.02	11.50	+ 8.00	− 4.33
San Francisco	16.22	13.16	10.57	−18.87	−19.68
Washington	23.54	20.86	15.87	−11.38	−23.92

*" Returns to Census Bureau incomplete, considerable number of deaths omitted."

The best work now being done is in a city appropriating the largest sum per capita of population of any of the large cities to the health department, which tends to bear out the quotation appearing upon their official publications: "Public health is purchasable. Within natural limitations a community can determine its own death-rate."

Not until after the National Conference for the Reduction of Infant Mortality held in London in 1906, were efforts to reduce infant mortality thoroughly organized. This conference caused a general awakening,

and was followed by the formation, at first local, of associations in both Europe and America. These have continually increased in both number and influence, until today there are but few communities not realizing "that the great infant mortality is a national disaster," which constitutes the surest index of inefficiency of health administration, private and public.

The further study of the development of infant welfare work in the United States shows that the initiative, without exception, has been taken by private interests. Where these interests were successful and accomplished results, in a majority of instances through the education of the public, the municipal authorities were induced to recognize their full duties, and organize bureaus or divisions of "child hygiene." In most cities and states, this activity properly falls under the health department, but in the United States government is under the Department of Labor.

Municipal departments of child hygiene were organized first in New York in 1908, then in Philadelphia, Chicago, Detroit, Los Angeles, and Buffalo in 1910, in Boston, Cincinnati and Kansas City, Mo., in 1911, Milwaukee and Cleveland in 1912, followed later by Newark, Indianapolis, Rochester, Seattle, Providence, and others.

State control was given by Act of Assembly of Pennsylvania approved April 27, 1905, creating a state department of health. Under this power child welfare exhibits have been held, much circularization done, and organization of medical school inspection accomplished. In 1913 a law was passed by the New York legislature creating a division of child hygiene in the State Department of Health, as the result of the report of the special commission appointed by the governor in January, 1913, to make recommendations "as to changes in the public health laws" which was embodied in the governor's message to the legislature February 19, 1913; and among other things, advised that "each city with a population in excess of 10,000 and having an industrial population, should have one infant welfare station, and larger cities with an industrial population should have one such station for approximately each 20,000 inhabitants."

A division of child hygiene was created in the Kansas State Board of Health by Act of Assembly approved March 6, 1915, providing among other things that the "general duties of this division shall include the issuance of educational literature on the care of the baby and the hygiene of the child, the study of the causes of infant mortality and the application of preventive measures for the prevention and the suppression of the diseases of infancy and early childhood, and such other duties as are prescribed by the State Board of Health."

The United States government at a late date took cognizance of the importance of this subject, and by Act of Congress approved April 9, 1912, created a Children's Bureau in the Department of Labor to investigate "all matters pertaining to the welfare of children and infant life." This

Bureau collects information for publication. It has already issued pamphlets on "Birth Registration," "Aid in Protecting the Lives and Rights of Children," "Baby Saving Campaigns," "Pre-natal Care," "Infant Care," "Handbook of Federal Statistics," "Infant Mortality," "The Results of a Field Study in Johnstown, Pa., Based on Births in One Year," "New Zealand Society for the Health of Women and Children," and "An Example of Methods of Baby Saving Work in Small Towns and Rural Districts."

It acts as a clearing house for all private, municipal, and state agencies, through which information on any phase of infant welfare work is imparted, and endeavors to stimulate local interest in communities where it is most needed.

The only other national government activity is the Public Health Service, which has published at various times reports on "Milk Stations," a report of the "National Commissions of Milk Standards" and a booklet on the "Care of Children" compiled by the American Association for the Study and Prevention of Infant Mortality.

The first generally organized conference in this country on the prevention of infant mortality was held by the American Academy of Medicine at Yale University, November 1909, out of which grew the American Association for the Study and Prevention of Infant Mortality, which has carried on the work:

"Through studies and investigations by special and standing committees;

"Through annual meetings, the transactions of which form practically a year book on the subject;

"Through a campaign of education, by the publication and distribution of material on the subject; by correspondence from the home office, which as far as possible has served as a medium for the exchange of information on the part of the organizations engaged in baby saving work, or planning to do so; by use of the travelling exhibit."

Among the earliest municipal activities may be mentioned: The Good Samaritan Dispensary of New York, 1891; The Pasteurized Milk Stations of Nathan Strauss, 1892; Milk Stations in Rochester, New York, 1897; Milk Fund Association, Cleveland, 1899; commencement of child hygiene work by the Department of Health, New York City, and the Philadelphia Modified Milk Society, Philadelphia, 1903; Babies' Milk Fund Association, Baltimore, and the St. Louis Pure Milk Commission, St. Louis, 1904; Poor People's Modified Milk Service, Boston, Association for Improving Conditions of the Poor, New York, and the Chicago Milk Commission, 1905; Babies' Dispensary and Hospital, Cleveland, and Committee on Modified Milk Stations, Boston, 1906; and Louisville Babies' Milk Fund Association, Louisville, 1908.

Up to this time nearly all work had been concentrated on providing a pure milk supply for infant feeding, as diarrhea and enteritis, constituting the greatest preventable menace to infant life, until recently, was believed to be entirely caused by rapid deter-

ioration of uncooled or improperly kept milk, especially in hot weather. The mortality rate in the United States from these diseases was but little affected until after 1910, although local efforts to improve the milk supply showed results in certain communities prior to that time, as shown in Table No. 4.

Improvement and efficiency has been marked from year to year, showing progress from the earliest effort to improve the milk supply, until the following activities are now incor-

TABLE 4.

DEATHS FROM DIARRHEA AND ENTERITIS UNDER TWO YEARS OF AGE PER 100,000 OF POPULATION.

Cities.	5-year averages.		3-year average.	Per cent. change.	
	1901 to 1905.	1906 to 1910.	1911 to 1913.	1906 to '10 from 1901 to '05.	1911 to '13 from 1906 to '10.
Baltimore	129.4	118.0	99.1	− 8.8	−16.0
Boston	107.4	99.2	87.9	− 7.6	−11.4
Buffalo	112.0	139.7	127.2	+24.7	− 8.9
Chicago	104.4	138.0	137.9	+33.2	− 0.7
Cleveland	104.0	132.4	135.6	+27.3	+ 2.4
Cincinnati	77.7	86.2	65.6	+10.9	−23.9
Denver	47.4	55.1	30.6	+16.4	−44.4
Detroit	99.6	102.8	101.2	+ 3.1	− 1.5
Indianapolis	48.1	68.4	51.8	+42.2	−24.3
Jersey City	125.9	142.7	95.6	+13.3	−33.0
Kansas City, Mo.	46.1	45.7	68.6	− 0.9	+50.1
Louisville	50.2	37.9	33.6	−24.5	−11.3
Milwaukee	95.9	119.0	100.1	+24.1	−15.9
Minneapolis	41.9	55.8	37.7	+33.2	−32.4
New Haven	110.0	91.7	68.4	−16.6	−25.4
New Orleans	113.8	130.3	109.7	+14.5	−15.8
New York	145.0	133.8	82.9	− 7.8	−38.1
Newark	106.5	112.9	104.0	+ 6.0	− 7.9
Philadelphia	96.8	133.5	104.0	+37.9	−22.1
Pittsburgh	170.2	169.1	126.2	− 0.6	−25.3
Providence	134.7	120.2	73.1	−10.7	−39.2
Richmond	127.2	133.6	116.3	+ 5.0	−12.9
Rochester	51.6	82.6	87.9	+60.0	+ 6.4
St. Louis	62.8	73.7	76.4	+17.4	+ 3.7
St. Paul	43.7	58.0	45.4	+32.7	−21.7
San Francisco	57.7	47.1	37.3	−18.4	−20.8
Washington, D. C.	118.8	99.0	66.0	−16.6	−33.3

porated in most well equipped health centers controlling infant life.

Milk.—Milk stations were primarily established to provide milk of good quality for infant feeding, for which mothers and care-takers were compelled to call. Later, milk was delivered to the house, at cost, below cost, or free. In the latter case the expense was borne in many cities by private relief agencies. It took but little practical experience to demonstrate that the provision of a pure milk supply was of but little benefit if the milk was improperly kept after its receipt in the home, so the education of the mother and care-taker became most important, and the visiting nurse was added to the milk stations for this purpose. Then physicians were employed to advise mothers how properly to care for sick babies.

Clinics.—Clinics were thus established with daily service, in some cities, during the hot weather, in others during the entire year. The education of the mother became of more and more importance, so that demonstrations, lectures, and distribution of literature were added features of the medical dispensaries and clinics, so they then in reality became,

Welfare Centers.—Welfare centers, of which there were in 1914 a record of forty-three in thirty different cities of over 50,000 population, twenty-nine of which were supported by private benevolence. Dr. Philip Van Ingen of New York, in a recent article, stated he had data "concerning 204 such centers in thirty-nine cities."

Visiting Nurses.—The visiting nurse is the most important function in the reduction of infant mortality. In most cities a nurse is sent to all tenements and poor districts upon receipt of information of a birth or expected birth. Subsequent visits are not made without the consent of the mother, attending physician, or midwife. The nurse gives instruction in child hygiene, care of the baby, general sanitation and the importance of breast-feeding.

Dr. Josephine Baker, Director of Child Hygiene in New York, in an argument for additional nurses, demonstrated that "babies can be kept under continuous home supervision at a cost of sixty cents per month per baby, as compared with two dollars per month per baby under care of milk stations." She further says "the solution of the problem of infant mortality is 20 per cent. pure milk and 80 per cent. training of the mothers. The infant milk stations will serve this wider usefulness when they become educational centers for pre-natal instruction and the encouragement of breast-feeding and teaching of better hygiene, and the mothers instructed to buy the proper grade of milk at a place most convenient to the home." The proper home care of infants by their mothers in relation to mortality is forcibly demonstrated by the experience in Lowell, Mass., and Paris; in the former city during an extended labor strike in the mills, women could not work and perforce were compelled to remain at home and nurse or give constant care to their children. During this period infant mortality decreased, while the general mortality, as a result of privation and poverty, increased. And

in Paris, during the siege in the Franco-Prussian war, when opportunity for outside work was cut off, and women were compelled to remain at home, the general mortality doubled, while infant mortality fell off 40 per cent.

Housing and Sanitation.—Bad housing and sanitation bears directly on infant mortality. A large number of diseases are produced by conditions coming under the head of bad housing. Lack of cleanliness, bad ventilation, poor light, bad drainage, etc., are being combated by the visiting nurse, but the abatement of nuisances must be accomplished by public health officers, who, in a few communities, have been ably assisted by local and private housing commissions, and the National Housing Association, whose efforts in improving the condition of the poor, and the lowering of mortality, have been demonstrated where their activities have been most needed.

Midwives.—The supervision and control of midwives are under state and municipal government in many parts of the country. In thirteen states, midwives are allowed to practice without restraint, and in fifteen others, there is no control or requirement for training or licensure. In some cities where examinations for licensure are required, schools for instruction have been started; for example, New York operates a school in connection with the Bellevue Hospital; in Philadelphia a similar course has been inaugurated in connection with the Philadelphia General Hospital and the Preston Retreat, and continued until 1913, when the control of midwives was vested in the "State Board of Medical Education and Licensure" by Act of Assembly.

Day Nurseries.—Day nurseries are very numerous. They provide daily care for babies and children, and although some are most worthy charities, yet others are insanitary, poorly managed, and productive of harm. These nurseries are rarely under municipal control.

Little Mothers' Leagues.—Little Mothers' Leagues, inaugurated in many cities, have awakened great interest in the care of infants, and are today an important feature in imparting knowledge in the home, and eventually will prove of inestimable value in the improvement of the future race as these young girls become mothers. Classes of girls are formed, generally in connection with the public schools. Lectures and demonstrations on the care of the baby are given by physicians and nurses. In many cities examinations are held and medals or other insignia are awarded at the end of the course to those who have put their knowledge to the best practical use.

Boarding Out Infants.—The municipal supervision, in many cities, of the boarding out of infants has been important in bringing under control the so-called baby farms, which have frequently been in the past an important feature in increasing infant mortality, in encouraging immorality, and the deserting of babies by their parents.

Education and Publicity.—"Philadelphia is the first city to teach the vocation of motherhood to girls in public schools as part of their curriculum." This instruction was made part

of the Domestic Science course by the Board of Education in 1914.

The Western Reserve University of Cleveland has recently added to the curriculum of the senior class of the Medical School eight hours for the study of "Practical Training in Social Medicine Pertaining to Infant Welfare Work." The importance of this can be attested by Civil Service examiners, who have noted the lack of knowledge in this particular branch of hygiene on the part of physicians taking examinations for interne-ships in hospitals and various positions in public health service.

Among the first to use publicity in the campaign for child welfare were Nathan Strauss, of New York; the *Delineator;* the Russell Sage Foundation; the Metropolitan Life Insurance Company, and a few other private agencies. Special note should be made of the work of the Metropolitan Life Insurance Company, as great impetus, irrespective of motive, has been given publicity by their work of recent years. Much good has been accomplished through the issuance of a book called "The Child," over three million copies of which have been distributed by the physicians and agents of this company to its policyholders. This publication was followed by a pamphlet on "Milk and its Care," written by Professor Rosenau. Nurses are provided free for the care of the sick, and educational work in over seventeen hundred cities and towns. The Company, moreover, offers it services to all health officers.

Publicity by municipal departments has been obtained through circularization, milk stations, settlement houses, libraries, public schools, visiting nurses, medical inspectors, policemen, posters with printed instructions and pictures sufficiently attractive to find lodgment on the walls of the home, and newspapers, most of which have generously opened their columns for the education of the public in their own betterment.

Baby Contests.—Baby contests have been held for publicity purposes in many of our large cities, frequently under the auspices of some particular newspaper which has awarded prizes for improvements shown, and thereby added much to the public interest.

Exhibits.—Exhibits have proved among the most instructive form of publicity. In cities like New York, Chicago, and Philadelphia, they have been very elaborate and largely attended. The results obtained demonstrated the importance of this feature of the work to such an extent that the American Association for the Study and Prevention of Infant Mortality prepared a travelling exhibit first shown at the International Congress of Hygiene in Washington in 1912, when it was awarded one of the few diplomas of special merit. This exhibit has been in the field ever since and has been shown in twenty-eight cities. "The actual showing of this exhibit has been represented by but a small part of its usefulness. It has served as a basis for a number of exhibits," which have been adopted by many boards of health, a number of universities, chambers of commerce and other associations. Complete photographic sets of the exhibit, together with circulars of explanation

and instruction have been furnished many organizations.

Floating Hospitals.—Floating hospitals have been in use in certain localities. The best illustration of their efficiency is in Boston where this open air service was established and is maintained by private subscription. A large steamer leaves the wharf at nine o'clock in the morning during the heated term, cruises or anchors in the harbor, and returns at five o'clock in the afternoon. A sufficient number of physicians and nurses are in attendance to care for two hundred children per day. This is a worthy charity, but expensive. It is believed that the same amount of money spent in a more practical manner would give better results.

Pre-Natal Work.—Mortality during the first year of life in all registration cities of the United States has been decreasing. In 1909 this mortality was 22.31 per cent.* of the total mortality; in 1910 it was 19.95 per cent. and in 1913, 17.9 per cent. Yet a careful study of vital statistics shows that the number of deaths under one month of age has been continually increasing up to this period and especially during the first days of life; showing that efforts already exerted for the prevention of infant mortality, although successful for later age periods during the first year, did not affect

TABLE 5.

DEATHS BY AGE PERIODS, UNDER ONE YEAR IN THE REGISTRATION AREA OF THE UNITED STATES.

Age.	All registration cities.		Rural parts of registration states.	
	*1910.	1913.	1910	1913
Less than one day	10,614	11,694	6,573	9,668
One day	5,254	4,401	3,380	3,350
Two days	3,174	3,094	1,947	2,284
Less than one week	25,372	25,326	16,071	20,006
One week	6,284	5,680	3,956	4,543
Two weeks	5,150	4,221	2,920	3,273
Less than one month	41,420	38,692	25,392	30,285
One month	11,597	8,816	5,910	6,096
Two months	9,754	7,410	5,107	4,815
Three to five months	22,832	16,960	10,443	10,734
Six to eight months	16,828	12,637	8,209	7,259
Nine to eleven months	12,798	9,939	6,249	5,792
Under one year	115,220	94,454	62,309	64,981

* As the registration area of the United States in 1910 included 58.3 and in 1913, 65.7 per cent. of the population, an actual difference of population of 9,454,822 (15 per cent.), it would be impossible to make a fair comparison without the correction of the 1910 figures which has been done.

this early mortality, due to causes acting before birth; and concentrated attention upon the importance of pre-natal work which, during the recent past, has become more prominent and today plays a large part in the campaign to combat infant morbidity and mortality, the result of which is beginning to appear in our vital statistics.

Table No. 5 shows the comparison of mortality in cities and rural districts for various age periods under one year for 1910 and 1913. Here again there is a possible source of error, for in order to secure accuracy, we must assume that the same relation in increase of population holds for all age periods. In the cities a marked reduction has taken place in every age period, excepting under one day, demonstrating most forcibly the necessity for increased research work and study of pre-natal conditions responsible. In the rural districts the mortality in 1913 in nearly all age periods shows an increase, amounting to 18 per cent. in the total deaths under one year; while for the same time in the cities there is a decrease of 4 per cent. As but little effort in infant welfare work has as yet been made in the rural districts, the result is as expected, and places the credit for the reduction in this mortality to the campaigns waged in the cities. The earliest systematic pre-natal work has been done in New York, Cleveland, Philadelphia, Boston, St. Louis, Chicago, Baltimore, and some of the smaller towns, of which Fall River, Mass., may be specially noted.

A synopsis of the work in a few of our large cities will serve to show the varied methods adopted in different locations.

New York.—In 1891, milk was dispensed in the summer to sick babies by the Good Samaritan Hospital. In 1892, Mr. Nathan Strauss founded pasteurized milk laboratories in various parts of the city. In 1903, the Health Department appointed physicians and nurses to visit families of new-born babies. In 1905, The New York Association for Improving Conditions of the Poor entered into a vigorous campaign for clean milk, which movement was initiated by the Commissioner of Health. In 1906, the New York Milk Committee, supported by private means, was formed to investigate the entire milk problem; and within two years, engaged in active field work, by installing milk depots, and employing nurses to do instructional field work in connection therewith. They encouraged breast-feeding, and educated the mother in the care of the infant, and did experimental work to compare results "obtained by the continued use of pasteurized and of raw milk to determine" which was the more economical and satisfactory method of saving infant lives. The work of this committee and of Nathan Strauss has been largely instrumental in the pasteurization of ordinary market milk now required in many of our cities. In 1908, the Division of Child Hygiene in the Department of Health was organized with a chief, five assistant chiefs, sixteen supervising inspectors, one superintendent of nurses and one hundred and ninety-five district nurses. In 1909, the division took under supervision, mid-

wives, boarding places for children, day nurseries, and other institutions for the care of children. In this year Little Mothers' Leagues were started in the public schools, and in 1910 appropriations were increased sufficiently to maintain fifteen infant milk depots. In the same year twenty-three additional milk stations were opened in New York, and in 1911, an Association of Infant Milk Stations was formed to prevent duplication of work and bring the eight existing organizations, maintaining seventy-five stations, under central control.

Philadelphia.—Although some desultory and individual effort had already been exerted, the first organized movement was by the Philadelphia Modified Milk Society in 1903. Modified milk under various formulæ was delivered to mothers calling at the various stations in different parts of the city. In the spring of 1907 the Department of Public Health and Charities organized volunteers from various churches into committees on visitation of homes of young mothers. Philadelphia was first in the field to organize clinics for the treatment of poor school children. In 1908, an eye clinic, and in 1910, a dental clinic was established in the Bureau of Health. Prior to this time dental work had been performed in private institutions made possible through appropriations by councils for this purpose. In 1908 The Babies' Alliance was formed, to extend the work already started in every ward in the city, and to carry on a publicity campaign by circulars, bulletins, baby contests, Little Mothers' Leagues, and the newspapers. There was inaugurated in 1909 an aggressive campaign against the use of soothing syrups and other proprietary medicines, which received the official support of the Retail Druggists Association of Philadelphia. Classes of mothers were held once a week in different sections of the city, and prizes were given by the Babies Alliance and Light House to mothers for those babies showing the best results. A novel feature of education was introduced at this time by the Bureau of Health, consisting of large paper bags, upon which simple instructions to mothers were printed and placed over every bottle of milk sold. Every milk pitcher or can left on the door-step for milk was also covered with one of these bags. The latter served the double purpose of distributing information and preventing contamination of milk served loose. The success of this movement was made possible by the hearty coöperation of the milk dealers. In 1910, the Philadelphia Conference on Summer Work for Mothers and Children was started. It secured the coöperation of one hundred and fifty-seven private associations, covering day nurseries; settlement and neighborhood houses; social betterment agencies having facilities such as baths, camps, mothers' clubs, milk stations, etc.; agencies providing temporary shelter for mothers and children; modified milk stations; hospitals and dispensaries; associations providing convalescent care or outing; agencies visiting and inquiring into the needs of mothers and children in their homes; and the various bureaus of the City Department of Public

Health and Charities. This work, although financed privately, was conducted under the auspices of the City Department. The Philadelphia Modified Milk Society added milk stations, the Bureau of Municipal Research supplied one clerk and two nurses, the Phipps Institute, one, and the Starr Centre, two nurses. Work started May 1, and the publicity obtained proved sufficient incentive to have the municipal legislative body immediately appropriate sufficient money to employ one supervising nurse and eight visiting nurses, which constituted a commencement of a division of child hygiene. The district physicians and medical inspectors of the Bureau of Health were employed in this division during the summer recess of the public schools. A milk station, a clinic, an exhibit where lectures were given daily, were established on one of the city piers, and a hospital for sick babies on another. All requests for medical or nursing aid could be, day or night, forwarded to the central office in the Bureau of Health through the police or fire station houses, by telephone. Bulletins, posters and circulars were distributed largely through the police department. In 1911 an elaborate milk show was held at which the attendance was 110,681. In an adjoining auditorium, lectures and moving pictures were given daily. A commission was appointed by the mayor in 1910 to study the entire milk problem. An elaborate report was published February 15, 1911, which aided materially in securing public endorsement of improved rules and regulations authorized by Act of Assembly, approved April 27, 1909, which finally brought the milk supply of the city under the control of the Department of Public Health and Charities.

A Child Hygiene Committee was organized in 1911 which, in coöperation with the city health authorities, held a large Baby Saving Show visited by 67,507 people. Lectures and moving pictures were a daily feature. The benefit derived from this show was so great that it was converted into a travelling exhibit, and has been almost continuously used in different parts of the city. During the year 1913 alone, the attendance was 351,860. The Child Hygiene Committee changed its name in the year following to the Child Hygiene Association, which on September 30, 1913, incorporated under the title Child Federation, "to actively advance by original and constructive methods the best interests of babies and children in Philadelphia." They turned over to the Board of Education the Little Mothers' Leagues, and secured the introduction of the course on child hygiene in the public schools, as already noted. In 1914, through the efforts of this Federation, the Babies' Welfare Association, consisting of eighty-four various activities partly engaged in similar work, was organized to prevent duplication of labor by coördination and coöperation; thereby creating a central supervision of the various associations, and becoming a clearing house for all interested in child welfare work, with a central office in the Bureau of Health. Committees were appointed to do special research work, the effect of which is

already felt in the creation of most effective health centres, the better control of baby farms, lying-in establishments, milk stations, and day nurseries.

Cleveland.—The first effort to reduce infant mortality was made in 1902 with the formation of the Milk Fund Association which supplied modified milk to babies who were brought to the office of the Association. On July 5, 1906, the Visiting Nurse Association, an organization sending nurses into the homes of the sick, effected a coöperation with the Milk Fund Association. In December of the same year, the Babies Dispensary and Hospital was incorporated, which, at a later date, took over the already existing organizations and opened in May 1907 a dispensary in a converted frame building on property purchased, where both sick and well babies were brought. As the work increased, dispensaries were opened from time to time in various portions of the city, until 1908, when there were eight, for which the central office acted as a clearing house. In 1910, permanent buildings were erected for a central dispensary and milk laboratory. Through practical work and a publicity campaign, city councils in 1911 appropriated ten thousand dollars to the Board of Health for infant mortality work, making the Babies Dispensary advisors to the Board "in the manner of application of funds," and ended in establishing a department of child hygiene in the Board of Health, with the medical director of the Babies Dispensary and Hospital as director thereof. In 1912, all the dispensaries of the private associations were turned over to the municipal department, so that all the prophylactic work was conducted by the municipal government, and the care of the sick by the Babies Dispensary and Hospital.

It is impossible to cover all details that have a bearing on the progress of recent public health work, but the foregoing history of a few of our cities is a fair exposition of the methods employed in infant welfare work. The results of these methods are found in a careful study of vital statistics. Notwithstanding the great progress, it is well known that but a beginning has been made, as the field of opportunity is ever broadening, and new problems constantly arise, that at the time appear almost insurmountable.

Let us trust the results already obtained may prove an incentive to renewed efforts that, in view of past experience, will undoubtedly place in the list of preventable deaths, prematurity and congenital debility, which now exact such a toll during the first few days of life.

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THE MUNICIPAL CONTROL OF DIPHTHERIA—A NEW METHOD.

DR. W. G. MCKAY,
Jacksonville, Fla.

Read before the Public Health Officials Section of the American Public Health Association, Jacksonville, Fla., December 2, 1914.

UNTIL 1913, the Jacksonville Board of Health followed the customary methods in handling diphtheria cases, that is, quarantine of all cases until two successive negative cultures had been obtained, followed by the disinfection of the rooms occupied by the patient. For nearly two years the Board of Health has carried out a plan for the control of diphtheria, which has been used in institutions, but probably it is new as applied to municipalities. In this method we have in view not only the isolation of diphtheria cases, but also the early recognition and isolation of diphtheria "carriers."

Our methods briefly summarized are as follows:

As soon as a case of diphtheria is reported, a nurse is sent to the house and cultures are taken from all the other members of the household. If any "carriers" are found, they are isolated in the same manner as though they were a case. If the "case" has been attending the public schools, cultures are taken from all the pupils and teacher of the room attended, and all "carriers" found are quarantined.

When two negative cultures have been obtained from a "case," cultures are again taken from the members of the household, and if "carriers" are found, the quarantine is continued until the "carriers" have had two successive negative cultures.

As most cases of diphtheria occur among children of school-going age, efficient school inspection is of great value in the control of the disease.

At the beginning of the school year, a preliminary survey of the schools is made and cultures are taken from all children who complain of "sore throat" or whose throats look at all suspicious of diphtheria. In this early survey some few cases and numerous "carriers" are removed from the schools before they can become a focus of infection. The successful employment of this method of diphtheria control is dependent largely on two factors: efficient school inspection and easy access to an efficient laboratory.

The use of this method can keep a laboratory very busy, for there may be a very large number of cultures to examine, especially if several cases occur at the same time among school children. At the beginning of the school year in 1913, there was a mild epidemic of diphtheria among the school children and frequently there were two hundred or more cultures to examine daily, including school cultures, "contacts" and release cultures.

We were very fortunate in having the Central Laboratory of the State Board of Health located in Jackson-

ville, as Doctor Hanson very kindly took a great deal of this work off my hands, and during the past year has handled all except the school cultures, which were examined in the City Laboratory. The school cultures are taken by the school inspectors or school nurses and the cultures from the "contacts" are taken by the school nurses or by the physician in charge of the case.

During the past two years we have kept quite complete records of our cases and "carriers" and some interesting data has been obtained. The majority, 76 per cent. of the cases among school children occur among those in the first four grades. Only eight grades have school inspection. 64.7 per cent. of "cases" and "carriers" have abnormal tonsils. In 45 rooms examined, 1,634 pupils were cultured and 97 "carriers" found, a percentage of 5.32.

During 1913, 36 "carriers" were treated with a lactic acid spray. A bouillon culture of bacillus acidi lactici was used and was sprayed in the nose and throat several times a day. The majority of "carriers" used some chemical antiseptic, and from the data we have collected there is very little difference in the length of quarantine in the two methods.

There has been less than a third as many cases up to the first of December this year as there was last year during the same period; but this method of diphtheria control has not been in force long enough to draw any definite conclusions.

I have not gone into the question of the virulence of the diphtheria bacilli found in the throat of "carriers" but the Board of Health has taken the stand that it is wiser, for the sake of the community at large, to consider "carriers as infective as cases, and to treat them accordingly."

Discussion.

Prof. B. L. Arms (*Galveston, Texas*): Our experience in the examination of cultures for carriers was taken at the suggestion of one of the men in Boston who saw in that a panacea for all diphtheria. If we could take a culture from every school child at the opening of the school year, there would be no diphtheria. Consequently, at the opening of the schools in 1909 we had cultures from all children in one ward of the city. We took two cultures, from the nose and throat of each pupil and teacher in that district, taking them the first four days in the week and repeating it the following week. We had in the two weeks some 8,233 cultures. In our series, we found practically 1 per cent. of the children carriers, but we found that there were no clinical cases from those and not one of the clinical cases in that district could be traced to any of those carriers. There was no diminution in the number of clinical cases in the ward that year. Our conclusion was that, in case of an outbreak, then was the time to take cultures, and I certainly believe in taking cultures from all contacts, in either the school or the family, and we tried to get the Galveston Board of Health to do that at that time but they never felt that they could.

Dr. C. E. Terry (*Jacksonville, Florida*): The method offhand seems like a rather cumbersome one and in discussing it with several members of this Association before we instituted it, we were told that we would get into all kinds of trouble if we started anything like that. As Doctor McKay stated in the beginning of his paper, it was instituted in what promised to be a little outbreak of diphtheria. It was on the increase

when we started it but there were not a great many cases in the city at that time. We started the method just about the time the schools opened. The diphtheria had been increasing before the opening of the schools, and we noticed as we went along taking these carrier cultures, that we began to find a smaller percentage of carriers after a week or two than we had been finding in the rooms from which we had removed cases or carrier cases, and we attempted to make a prophecy that although the cases were still increasing as they were at the time, when we noted a decrease in the percentage of carriers found, that the cases themselves would soon decrease, and in the privacy of our own office we made that prophecy, and to one or two intimate friends outside, that in about a week or ten days there would be a marked dropping off in the cases reported in the city. As a matter of fact, I haven't got the figures with me, I forgot to get them this morning, but as a matter of fact there was a very marked dropping off, in fact such a marked one that it was almost a perfect vindication of the institution of the method. From about three or four of the school districts where diphtheria had been rapidly increasing and where we had quite a large number of cases under quarantine, the cases reported at the expiration of this period of ten days after we had noted a decrease in the number of carriers found, the percentage of carriers found, of contacts with cases, we had a very marked decrease in the number of carriers. It caused some little discussion among the public, among the families that we cultured, and we put one or two stories in the paper about diphtheria carriers and disease carriers generally, and I am glad to say that, beginning with a few days after those stories appeared, we had requests from parents saying "My child has got a little sore throat, does not seem sick, I don't want to call the doctor because I can't afford to if it is unnecessary; won't you send out and take specimens and see if it is diphtheria?" Which we were glad to do. We have had no opposition, practically, only from a few unthinking persons, but very, very little, and I think the public is educated as to what a disease carrier is; the school children certainly know, and they are first class instructors and I think their parents know pretty well. We found that the period of carriage in household specimens, that is, where we found a case we would swab the family, or where we found a carrier we would swab the family, the percentage of carriers found where a carrier case was the cause of the taking of the swab, was larger than where a case was the cause of the taking of the swab. Usually when a case developed, that patient was fully and promptly isolated from other members of the family, but where we found a carrier in the family, we found a greater proportion of the other members of the family carriers than where cases were the cause. The average duration in a carrier was about 9 days. The longest carrier we had under quarantine was 34 days, the shortest, two or three days, but the average period was about 9 days and we don't consider it a hardship in view of the results which we apparently obtained, to quarantine even a large number of school children for that period of time. Another advantage is that we prefer to operate this method while schools are open, we don't think of closing them, and we have the children under much better control and can get much quicker results during the school term than by the same method during school vacation. It has been customary on occasions to close the schools when diphtheria was present, but they have not been closed and will not be closed. Where we quarantine a carrier, we feel it incumbent on the health department to see to the releasing of that case. A few have called their family physician, but the vast majority, probably 98 or 99 per cent., rely on us entirely, are glad to have us take charge of the case and all that is done by the nurses. We tried recommending and furnishing free the young culture of the lactic acid bacillus. Doctor Mayo, I think, read a paper at the last meeting of the American Medical Association. We did not find that the use of that culture, even used carefully, made much difference in the period of quarantine, but tried to go to these houses and take cultures every other day or so until they were released. If we get a positive today from the throat, we don't take a culture till day after tomorrow. If we get a negative today, we take a second tomorrow, so as to release them as promptly as possible; and on the whole I believe we have got results. It is too early to say yet, but we have had very much less diphtheria during the year, and several times during the year, groups of two or three or four cases have cropped out, but they have not given rise to others. We have had the neighborhood

quarantined and school rooms swabbed and have not had a tendency to have the disease spread all over the city since this method was instituted.

Dr. Frank L. Wright (*New Haven*): I would like to report that in New Haven we have been doing this same method every year, except that we have not taken cultures from all the school children. We have taken cultures from all the children in the house, and taking a 12 or 16 family house, it is no small job; we have taken cultures of all the children and as many adults as possible, in those cases. We think we are seeing results. For something over a year we have done absolutely no terminal disinfection, depending entirely on negative cultures, and have yet to see a recurrent case.

Dr. Chesley (*Minneapolis*): I am very much interested in this so-called new method. I don't think it is very new in the practice, but I don't believe it is necessary to take separate nose and throat swabs, and I believe that, in justice to carriers, virulence tests should always be done. In Minnesota it has been the custom for a considerable period of time, several years, to isolate and test for virulence any case, clinical or otherwise, in which the bacilli persists for 30 days after the date of first symptoms, and when we find that the organism shows no virulence in a test, we release without fear any further restrictions on that patient. We do find, however, that practically it is impossible to find a carrier intimately associated with a clinical case showing a non-virulent organism and that the organism occasionally is located in the nose only. The danger I believe from carriers is chiefly in proportion to the amount of secretion from the nose and throat. I think that a carrier which can have diphtheria organisms that are virulent and without any excessive secretion, may be associated with children even without any one developing clinical diphtheria, but as soon as a condition arises which gives an excessive secretion, then trouble follows, and I think that probably in Doctor Chapin's method, the amount of nose and throat discharge has more to do with success than anything else.

Dr. G. W. Goler (*Rochester, N.Y.*): It is very comforting to think that a good many municipalities are trying to control their diphtheria not only by oversight of carriers but in other ways. We have in Rochester a hospital for the treatment of infectious diseases, including diphtheria. We have one man who takes 95 per cent. of all the cultures. When a case of diphtheria is reported to us over the telephone, the telephone clerk tries to get something like the following information: "When do you call? How sick is your case? Is the breathing bad? Has it enlarged glands? Are there children in the family?" If so, we don't wait for a culture, but advise the doctor over the telephone what he is to do for the case, how much antitoxin to give, whether we think the case needs intubation; in other words, we make a sort of telephone diagnosis of the severity of that case. "Did you give antitoxin subcutaneously or intramuscularly or intravenously?" If there are any other children in that family going to school, the medical inspector in that school goes there, looks over the children in the school and puts to one side those who have apparently inflamed throats. Cultures are made on those throats and if any carriers are found, they are excluded. To the family assistance is offered in the way of the intercutaneous administration of antitoxin, etc. The treatment of carriers is what I tried to get out of Doctor Terry, and he wouldn't say anything about it. What are we to do with these carriers? How are we to get rid of the organisms in their throats? Aside from cleaning their teeth and cleaning out their noses and throats, that is, taking out their adenoids, I fail to see anything in my experience that has offered a basis of assistance in the treatment of carrier cases of diphtheria. All the sprays, all the applications of any sort whatever, are worthless. As a disgusted medical friend of mine said some time ago when he was asked by a not over intelligent physician what he believed to be best for the treatment of diphtheria, he said, "I don't know of anything but spit."

Dr. Frank L. Wright: Doctor Goler hasn't told us what he does with his carrier cases.

Doctor Goler: Yes, I said, aside from the excision of tonsils and removal of adenoids and cleansing of teeth, that is the only way we find to get rid of our carriers.

Doctor Wright: Do you quarantine them?

Doctor Goler: Oh yes, we keep our carriers just as we would diphtheria.

Doctor E. C. Levy (*Richmond, Va.*): We have been following this method for two years and I had in Richmond one very interesting class of cases. Our medical inspectors two years ago

began to notice in a considerable percentage of diphtheria in school children, evidences of chronic nasal diphtheria. Many of those cases were of months' duration during which time they had been going to school. In at least two such cases several children had been going for daily treatment to a laryngologist in the city, going to the office and having instruments used that had been used on others, too often without proper sterilization. This medical inspector for some reason or other gave these children antitoxin. I told him I could see no way in which antitoxin could possibly have any effect, but if he wanted to try it, go ahead. The cases were nearly all of many months' duration, scarcely simple bacteriological cases, because they did have some clinical symptoms. Very remarkable to relate, in every instance, within a week or ten days, the nose trouble stopped and the organism just cleared. I don't know why. It is not logical as I see it. Another thing Doctor Chesley brought out, it seems to me we ought not to be confused by the enormous proportion of individuals in whose noses and throats we can find organisms morphologically resembling diphtheria bacillus. That is altogether in finding that in a house or school room in which there is a case of diphtheria, in those cases we can safely assume that those organisms are diphtheria bacilli.

Doctor Goler: I neglected to speak of the Shick method—if any one has had any experience with it.

Dr. Chas. J. Hastings (*Toronto*): As you will perceive, Doctor Levy and myself have the platform, so we will speak in succession. This problem of the carriers, as you will recall the experience they had in Baltimore, where I think they found, from the extensive investigations they made there, that 3 per cent. of all the school children in Baltimore were carriers. Now we had thought of undertaking this in Toronto, too, but when we got a vision of 15,000 swabs that we would have to examine and then repeat those over and over and also quarantine probably 15,000, we saw rather a severe problem ahead of us that we did not feel disposed to tackle. Our practice in Toronto is wherever we have a case of diphtheria reported from any institution, that we have swabs taken of all the possible contacts in connection with that institution, to make sure that there are no carriers, and the same is true in regard to all schools, and all the contact cases are swabbed, both nose and throat. So far as the treatment of the carriers is concerned, we quarantine the carriers. Of course we have quite a number of cases reported of carriers from the medical inspectors of the schools. We quarantine the carriers, but it is a limited quarantine, that is it is not as rigid as that under ordinary circumstances; we simply quarantine the patient. We quarantine the carrier, but no other members of the family, and I don't think that one is warranted—there would be no object in our taking that precaution. Now we give the families, however, the option; if they prefer to have all the contact cases in the family swabbed, rather than to have all the contact cases put under quarantine for the full time of incubation of the disease, why we do so. But otherwise than that, we felt that it would be almost too great an undertaking for a city of half a million or over. I think for smaller municipalities it is quite justifiable; in fact I think it is a proper procedure and I think they can hope for good results. I do think, however, that it is very, very important to call into requisition the valuable services of the guinea pig if we are going to arrive at proper conclusions as to which the most emphasis should be placed on. Is there any further discussion?

Doctor Gorder (*Baltimore*): I don't think I can add anything to what has been said. We isolate the carriers where they are in school and treat them very much in that particular as we do the diphtheria cases. We do not isolate the family as rigidly, and we have done some work on guinea pigs in those obstinate cases of carriers, but we feel that we have a great deal to learn on the subject yet and I come here more to learn than to teach.

Doctor McKay: Speaking of carriers, we only quarantine the carriers; we don't quarantine the family. The carrier is the only one that has to stay in; the rest can go about their business.

Mr. Wells: I want to make a motion to this effect;

"*Resolved*, that the routine disinfection of schoolrooms after a report of scarlet fever or diphtheria, is not recommended by the Association."

My reason for making that motion is that the proprietors of certain disinfectants have pes-

tered the life out of certain boards of education in the country and I have all I can do to hold our own Board of Education down to the ground. Some Boards are considering at the present time very seriously the adoption of a resolution to require disinfection of the classrooms after a report of a case of diphtheria or scarlet fever, and it seems to me that if such a resolution were adopted by this Section, it might strengthen some health officers who are trying to educate the public into the recognition of the fact that it is the carrier, not the school or individual patient or school room that is the source of infection.

The resolution was seconded.

Doctor Hastings: There are just two or three things I would like to say. There is a similarity between modern theology and modern sanitation. You can all remember when you were shaking over hell fire and all that sort of thing, but you don't hear anything of it now. It was a long time before the ministers had the courage to really say from the pulpit that they didn't believe in material fire, hell, etc., and I think probably advisedly so because in the olden times they found it necessary to terrify people along that line in order to make them live up to the mark, but now the intelligence of people is appealed to a little more, to develop the divinity within them rather than fear the hell they are going to face afterwards. Now the advances along theology have been carried on in a very careful way and I think advisedly so. If we spring on to the public some new idea, I don't think there is any second opinion in this section in regard to the absolute absurdity of the fumigating of rooms after communicable disease, if we get to work and have those rooms well scrubbed out and then properly gone over as far as the patient might have reached with a bi-chloride solution, we will accomplish more than by fumigation, but I think we want the moral effect of the disinfecting of a school room; it is most valuable. We have our own fixed ideas in regard to these things, but if we are changing, they will say "For Heaven's sake, what's coming next? How do we know that there is really an infection? The health officers themselves are changing their opinion every year or two." I think we have got to go carefully along these lines, according to our judgment, but do a few things for the moral effect those things will have.

Doctor Goler: I move, as an amendment to Mr. Wells' motion, "that the routine disinfection of school rooms and other places be abolished, that that is the sense of this section."

Doctor Wright: I would not like to see it go quite so far as Doctor Goler suggests; I would like to say "be condemned."

Mr. Wells: I second the amendment to the resolution doing away with it altogether.

Doctor Hastings: You have heard the amendment. Now gentlemen, I sincerely hope you will travel slowly along this way, if you don't want to place yourselves in a ridiculous position, no matter what your opinions may be, it is not always wise. Take my advice and move slowly; that is my suggestion along this line. I don't think there is any second opinion, but the time in my judgment, is not ripe for us to take such drastic action as this.

Doctor J. S. Neff: If it would not be an act of discourtesy, I would move to lay on the table, but although agreeing with many of the remarks made as to fumigation and disinfection under many conditions, at the same time this would be a very dangerous motion to put through this section. If this motion is carried, it goes to the Association through the Executive Committee to be discussed on the floor, and, I think, beaten there, and I think the majority of people in the Association, although they might be wrong, would think this is an asinine proposition coming from this section of medical men. Tuberculosis, fleas, plagues, all kinds of numerous animals, cockroaches and everything else would no longer be under the ban and we would cease disinfection and fumigation under all circumstances. I think that is dangerous—I won't say asinine.

Doctor Snow: I rise to a point of information. If this is coming to a vote, I wish to ask Doctor Goler what is his definition of disinfection? Doesn't it include fumigation?

Doctor Goler: Yes, sir.

Doctor Snow: To get rid of mosquitos?

Doctor Goler: Oh no.

A vote was then taken on Doctor Goler's amendment and it was lost.

Doctor Hastings: All in favor of the original motion, for doing away with the disinfecting of school rooms, will manifest it by the usual sign.

MR. WELLS: The motion was "The routine disinfection of school rooms after the report of every case." There might be cases in which you might desire to disinfect; we don't condemn it, but simply condemn making a routine practice to disinfect after every case, no matter whether they were taken the night after they left school or taken Sunday and had not been in school since Friday.

DOCTOR HASTINGS: I think that modification is very, very important. I didn't know there were any health departments that were in the habit of disinfecting after a single case. All in favor of condemning the routine method—now that is your motion, is it?

MR. WELLS: That motion, as I explained, was to give boards of health something to show to the Boards of Education. Now I had all I could do, as I stated, to hold our Board of Education down on firm ground, and I told them I would put this question at the meeting of this Association and I thought I would come back with a vote of 100 to 0 on my side of the case.

DOCTOR LEVY: This is to go to the general association for their adoption, is it? Or is it just for adoption by this Section?

MR. WELLS: Just by this Section is all I care for.

DOCTOR HASTINGS: The motion, as the Secretary has it down here, is that routine disinfection of schoolrooms after a report of a case of diphtheria or scarlet fever in such rooms is regarded as unnecessary, by this Section.

The resolution was adopted.

PERMANENT SEDIMENT RECORDS FOR WATER AND SEWAGE.

GEORGE C. WHIPPLE,
Professor of Sanitary Engineering, Harvard University and the Massachusetts Institute of Technology.

and

JOHN W. M. BUNKER,
Instructor in Sanitary Analysis, Harvard University.

Read before the Laboratory Section of the American Public Health Association, Jacksonville, Fla., December 1, 1914.

IN spite of all that has been said and written on the subject of water analysis and in spite of the fact that hundreds of samples of water and sewage are being analyzed every day, it still remains true that the results of the analyses are unintelligible to a large proportion of the people who are interested in the general subject, and we might add to a great many of those who make the analyses. The interpretation of a water analysis we have been told over and over again is a matter for the expert.

Yet there are some characteristics of water that are evident to laymen and expert alike—the conspicuous physical characteristics of color and turbidity, taste and smell. Within recent years tests for these properties have been simplified and standardized, but simple as they are the results cannot be understood by one who does not know the scales of measurement. There is often needed some means of bringing to people's attention the character of a public water supply or the condition of water in a stream, or that of a sewage effluent, and this must be done by appealing to something within their every-day experience, by presenting something that they can see or smell or taste. Such a something is dirt.

Every citizen desires a supply of clean water. If the water supply is dirty it fails to give satisfaction, and any method which will exhibit its dirtiness will appeal to a universal instinct and experience. We all desire clean waterways. We believe that the final effluents from sewage treatment works should be reasonably clean—otherwise why treat the sewage—and any method which will exhibit the dirtiness of the water in a stream or in a sewer will prove a useful weapon in the fight for cleanliness which is being continually waged by sanitarians.

There are various forms of dirt found in water and sewage, if by dirt we mean substances which pollute or make foul. Some forms of dirt are in solution, or are present as colloidal substances, or as excessively fine particles. These require special tests, special methods of comparison and exhibition of results. But there is one form of evident dirt for which we have thus far had no satisfactory measure, namely, the coarser forms of suspended

matter. Our methods of turbidity do not adequately depict the presence of the larger particles of obvious dirt. These methods are largely optical and the larger particles of suspended matter do not greatly interfere with the passage of light through water unless they are quite numerous, hence they escape being recorded. A simpler method with more direct and picturesque results is needed. Such a method is the one about to be described. It is not original, being merely an adaptation of a method already in wide use for exhibiting and recording the amount of sediment in milk.

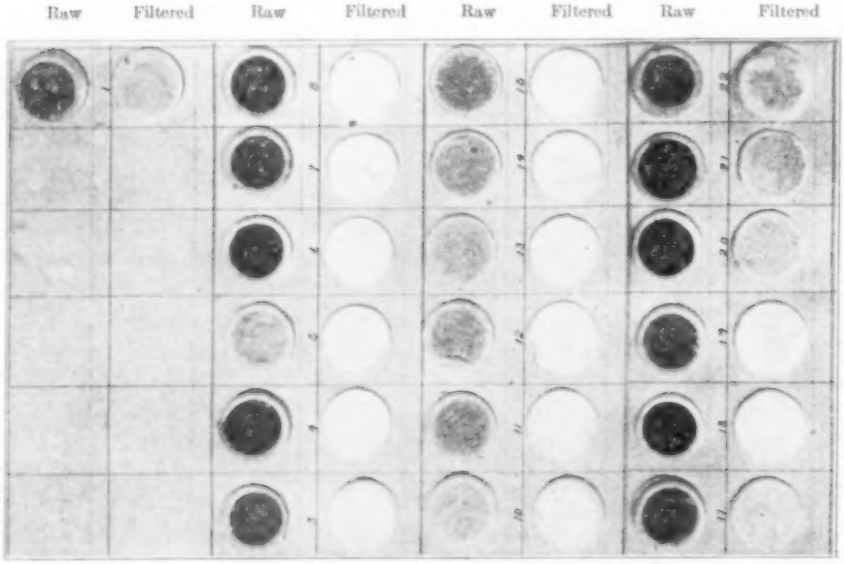
The method consists merely in straining a given volume of water, say one gallon, through a disc of absorbent cotton, about one inch in diameter, and especially prepared for the purpose. This is most conveniently done by means of a simple apparatus known as the "Wizard Sediment Tester," which is made by the Creamery Package Manufacturing Company of Albany, New York. The cotton disc, which is the filtering medium, is held between two supports of wire cloth in a cap attached to an ordinary glass milk bottle. The water to be filtered is placed in the bottle and allowed to flow out through the cotton disc. Filtration is hastened by increasing the pressure of the air within the bottle by the use of a simple air compressor operated by a hand bulb.

This particular form of apparatus is not necessary. Other similar sediment testers are on the market. Nor is it necessary to use compressed air in filtering. A gravity flow will give the same result, or a flow hastened by centrifugal force or by the water pres-

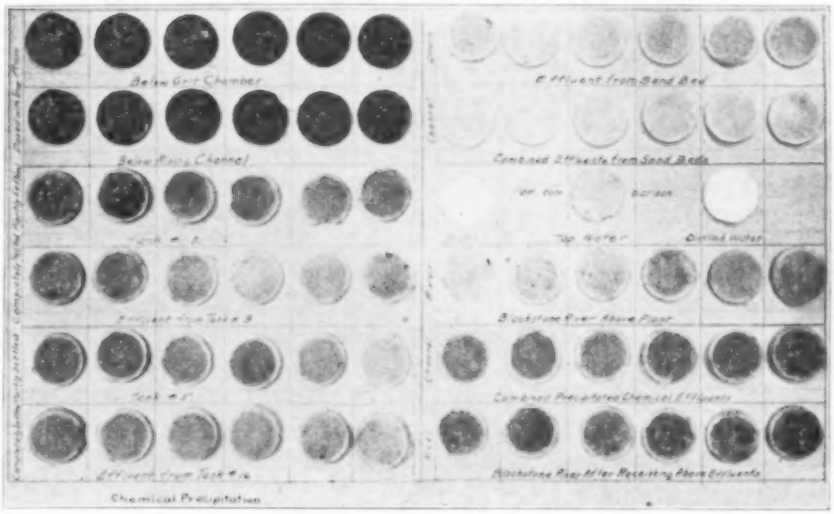
COTTON RECORD OF SUSPENDED MATTER

Obtained by Straining One Gallon of Water from

Filter at Pierce Hall, Cambridge, Mass., Aug. 1, 1914, to Aug. 15, 1914.



COTTON RECORD OF SUSPENDED MATTER
Obtained by Straining 200 cc. of Sewage from
Sewage Disposal Plant from Worcester, Mass., Sept. 30, 1914.



sure of the city mains. All of these methods have been used in the laboratory of sanitary engineering at Harvard University.

The coarse sediment in the water is retained in the pores of the cotton disc and remains as a permanent record which readily appeals to the eye and which by its appearance gives at once a good idea of the quantity and character of the substances present. For permanent record it is well to provide sheets or cards to which the cotton discs may be easily attached after drying by using a drop of mucilage or a "stamp sticker." The suspended matter does not change in appearance even after a long time, and does not shake off unless too much sediment is allowed to collect. For the sake of uniformity the writers suggest that the following table be accepted as a tentative standard for quantities of water to be filtered:

STANDARD QUANTITIES FOR FILTRATION THROUGH COTTON DISCS.

Filtered water	1 gallon.
Ground water	1 gallon.
"Clean" surface water	1 quart.
"Dirty" surface water	1 pint.
Sewage and sewage effluents	½ pint.

While the metric units of measurement are more scientific than the commonly used units of liquid measure, the latter are better comprehended by the public and are more appropriate for this crude test.

The quantity to be filtered varies with different waters. It is advisable to filter the smallest quantity that will give a definite record, inasmuch as increased quantities tend to pile up the

sediment on top of the first layer and therefore do not show small variations. A water rich in algæ will produce a definite stain on a cotton disc after one quart has passed through. A clean water does not leave any noticeable discoloration when this amount is filtered but may color the disc slightly when a larger sample is taken for the test. A typical crude sewage, on the other hand, will clog the disc when from 150 to 200 cubic centimeters have been strained, and more can be forced through only with great difficulty. The best sewage effluent will give some discoloration when this quantity has been filtered, so that a ready comparison is possible.

Samples of the sediment found in the tap water of Cambridge, Mass., have been taken almost every day for more than a year. The cotton discs record the changes in the growths of algæ with striking picturesqueness. In summer when the cholorophyceæ are abundant the stain on the cotton disc has a bright green color. During the ascendency of the cyanophyceæ, in the "dog days," the color is a slaty bluish green. The quantity of sediment fluctuates somewhat from day to day as the wind blows the algæ from one side of the reservoir to the other and as the algæ rise or fall in the water. In the spring the sediment has a brownish color due to the presence of diatoms. Samples of water collected at different depths show very distinctly the distribution of the algæ in a vertical direction from top to bottom. Normally the algæ are most abundant at the surface but decrease with greater depths. The samples at the bottom often show the presence of a brown-colored sediment due to the influence of the organic matter and iron found in the stagnant layers.

Any departure from the normal distribution is quickly noted by this method of examination, as is shown by a set of discs made at Lake Cochituate on October 2, 1914. This series shows a steady decrease in depth of color down to the transition zone at which point there is a darkening of the discs, due no doubt to a concentration of organisms at this point. Immediately below this, the organisms fall off, and again increase gradually until the forty-five foot level is reached. The last fifteen feet, from the forty-five foot depth to the bottom, show the presence of a different kind of sediment, darker in color and more abundant in quantity in which iron is present in large amounts.

On some days the amount of sediment in the Cambridge water has been found to suddenly increase owing to the disturbance of deposits in the pipes. The character of this sediment is quite different from that normally found. Again samples taken from the hot and cold water taps often show marked differences, the hot water sediments showing the presence of iron rust derived from the action of the water on the heater or the piping in the houses.

The method is particularly well adapted to show the effect of filtration on dirty water. During the past year an experimental mechanical filter has been in operation at the Laboratory of Sanitary Engineering, Harvard University, and daily records have been

kept of the sediment in the water before and after filtration. The results are often more striking than the figures which show the removal of bacteria. On certain days when the filter was not operating at its best the cotton discs through which the filtered water passed were slightly discolored.

Mr. Clifton L. Rice, who has been recently assisting Mr. Frank A. Barbour in a series of valuable experiments on the purification of the water at Lowell, Mass., has used the cotton disc method with marked success. Mr. Barbour's report shows photographs of the sediment collected on the cotton discs. The problem there is the removal of iron and manganese from the water. The efficiency of the purification processes which it is proposed to employ is well indicated by the stains made by the raw water and the absence of stain when treated water is passed through the cotton.

Professor Robert Spurr Weston recently exhibited to the New England Water Works Association some series of samples showing the removal of iron and manganese from other water supplies of Massachusetts by filtration.

The cotton disc sediment record has the following advantages:

1. It can be made very easily and quickly.

2. It can be made by the laborer and the office boy as well as by the engineer or chemist.

3. It is inexpensive.

4. The records are picturesque and easily understood by every one.

5. Within limits the records are quantitative as well as qualitative. They serve well for comparing samples from the same place on different dates.

6. The records are permanent.

7. The records may be conveniently mounted for preservation.

8. The records may be photographed.

9. A relatively large volume of water is tested.

10. It is a valuable supplement to the regular water analysis.

A STATISTICAL STUDY OF WHOOPING COUGH.

FREDERICK S. CRUM, PH. D.,
Assistant Statistician, The Prudential Insurance Company of America.

Read before the Vital Statistics Section of the American Public Health Association, Jacksonville, Fla., December 4, 1914.

THE first well-attested account of a whooping cough epidemic is that by Baillou, of Paris, who in 1578 wrote of a prevalent convulsive cough and remarked that the malady had not previously been described. In England it was not until 1701 that "Whooping cough and chincough" became a separate entry in the London bills of mortality. In that year six deaths were recorded under the dual title. During the first half of the eighteenth century 2,787 deaths were recorded as whooping cough in London and in the second half of that century the aggregate of the deaths reported under this title in London was 15,045.

It was in Sweden, however, that whooping cough seems first to have been assigned its rightful place in the nomenclature of diseases. During the period 1749 to 1764 no fewer than 42,393 deaths were recorded under this title in that country, an annual average of 2,600 deaths, and in 1755, an epidemic year, the whooping cough deaths numbered 5,832.

An international survey of the statistics of whooping cough reveals the fact that the mortality is world-wide in its geographical distribution. No climate, country or race seems to be immune to this disease, although its extent and fatality vary greatly in the different countries, and are apparently affected by the varying circumstances of age, sex, season, climate, altitude, etc.

WHOOPING COUGH MORTALITY IS WORLD-WIDE.

Combining the statistics of twenty-four countries for a recent five-year period it was found that 1 per cent. of the grand total of deaths from all causes was due to whooping cough. The average annual death-rate from whooping cough for these countries was 8.0 per 100,000 of total population. These statements are based upon an aggregate population of 1,908,270,362 exposed to death one year, a total mortality from all causes of 35,586,933 and an aggregate of 344,439 deaths from whooping cough. The countries represented include such widely separated areas as Japan, England, Chili and the United States. The death-rates from whooping cough varied in these countries from 66.5 per 100,000 of population in Chili to 1.9 in Ceylon. In the registration area of the United States the average annual death-rate was only 10.4 during the five-year period, 1908 to 1912, as compared with 23.8 for Prussia, 23.5 for England and Wales, 17.3 for Italy, and 8.2 for France. In Japan the average death-rate from this cause was 7.4 per 100,000 of population during 1906 to 1910.

The percentage of the total mortality chargeable to whooping cough varied considerably in the countries for which

the data were available, or from 0.1 per cent. in Ceylon, 0.4 per cent. in France and Japan, 0.6 per cent. in New Zealand and 0.7 per cent. in the United States, Australia, Denmark and Spain, to 2.7 per cent. in Scotland, 2.2 per cent. in Chili, 2.0 per cent. in Belgium and 1.7 per cent. in England and Wales. Of the twenty-four countries for which the data were compiled, eleven showed percentages under 1.0 and thirteen percentages of 1.0 or more.

Climate and Whooping Cough.

Some writers profess to find a relation between whooping cough mortality and climate, but all admit that there are many exceptions. Both Hirsch and Clemow state that the epidemic extensiveness and the severity of type of whooping cough increase, generally speaking, according as it is found in the tropical, subtropical, temperate and cold zones. In Iceland, however, this disease has always been infrequent while in Jamaica the average annual death-rate during 1908 to 1912 was higher than in Norway, Sweden, Switzerland or Denmark. Many other exceptions to the general rule could be cited but these are sufficient to indicate that climate is probably an etiological factor of only secondary importance either in the spread of whooping cough or in the determining of its type. Severity of climate or season undoubtedly is an influencing factor, other things equal, and this is readily explainable when we recall that the great majority of whooping cough fatalities are the result of complications or sequelæ and further that fully 60 per cent. of the fatal complications are of a respiratory character.

In this connection attention may be directed to the exceptional prevalence and fatality of whooping cough in La Paz, Bolivia. This city had a population of 78,856 in 1909. It is at an altitude of 11,910 feet and in latitude 16 degrees 30 minutes, south. Over a period of several years its annual rainfall averaged only 2½ inches and it had a fairly constant average annual temperature of 48.7 degrees Fahrenheit. During the nine and one-half year period, January, 1900, to July 31, 1909, the actual number of deaths from whooping cough in La Paz was 3,468, or equivalent to an average annual death-rate of 54.6 per 10,000 of population. Whooping cough was the most important single cause of death during this period and it constituted 14.8 per cent. of the total mortality. During the nine and one-half years whooping cough was apparently endemic in La Paz and the annual range in the actual number of deaths was from 252 in 1906 to 444 in 1904. In 1909, however, the mortality from whooping cough was above the average for there were 425 deaths recorded in the first six months of the year. No data are available subsequent to July 31, 1909.

The distinctive facts which may largely account for the excessive fatality of whooping cough in La Paz are the extreme altitude, light rainfall and cool temperature. There may, however, be other determining factors, for in Leadville, Col., which is at an altitude of 10,200 feet, with an average annual rainfall of 18 inches and with

an average temperature of 34.5 degrees annual Fahrenheit, the average annual mortality-rate from whooping cough during 1900 to 1909 was only 3.13 per 10,000 of population, as against 54.6 for La Paz. In Leadville, during the decade, whooping cough constituted only 1.4 per cent. of the total mortality, against 14.8 per cent. in La Paz. In Leadville, however, the rainfall is considerably heavier than in La Paz and the temperature is much more variable.

The mortality from whooping cough is so exceptional in La Paz that the following table is presented as a distinct contribution to the statistical literature of the subject:

MORTALITY FROM WHOOPING COUGH IN THE CITY OF LA PAZ, BOLIVIA, 1900–1909.

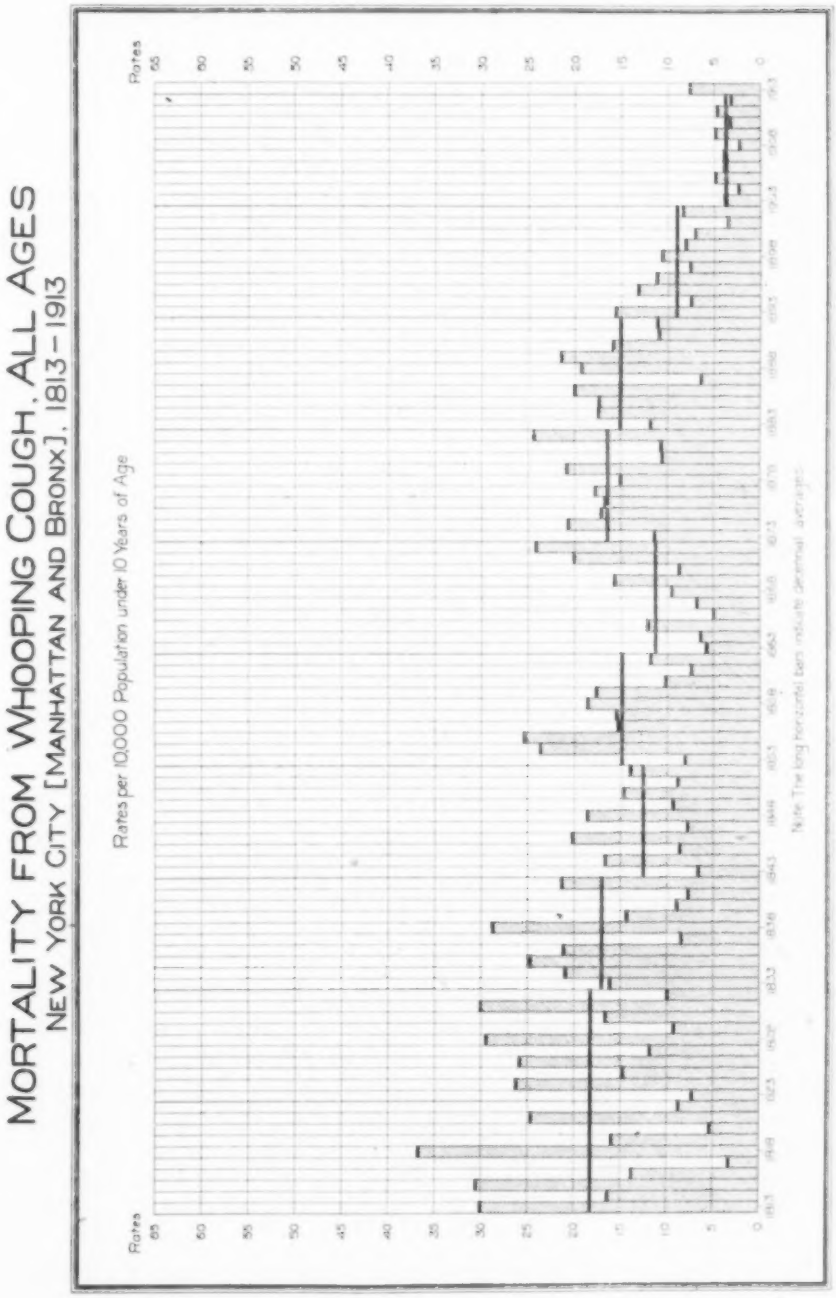
Years.	Population.	Deaths from whooping cough.	Rates per 100,000 population.
1900.....	59,633	368	617.1
1901.....	59,832	360	601.7
1902.....	60,031	318	529.7
1903.....	62,720	348	554.8
1904.....	65,410	444	678.8
1905.....	68,100	339	497.8
1906.....	70,789	252	356.0
1907.....	73,478	308	419.2
1908.....	76,167	306	401.7
1909.....	39,428*	425*	1,077.9
1900–09 ...	635,588	3,468	545.6

*Only for 6 months, January 1 to July 31. Source: Censo Municipal de la Ciudad de La Paz, 15 de Junio de 1909.

As whooping cough, even more than measles, is a disease of infancy and early childhood it is not surprising to find that its epidemics in any given locality are usually of frequent occurrence. This is clearly seen in the chart on page 997, showing the mortality from this cause in New York City (Manhattan and Bronx Boroughs) during a century and also in the chart showing the comparative mortality from whooping cough in fifteen representative American cities during the period 1900 to 1913. As a rule whooping cough in any given locality recurs in more or less epidemic form at intervals of one or two years.

Race and Whooping Cough.

The conclusion of Hirsch that "differences of *race* and *nationality*" do not "create a predisposition to or immunity from whooping cough" is even more easily verifiable today than when he wrote in 1881. That the American Indian is as liable to attack by this disease as the Caucasian is quite evident from a reading of the reports of the agency physicians of the United States and Canada who have reported numerous epidemics, many of them quite fatal in character. In the United States, during the period 1888 to 1893, in an aggregate Indian agency and Indian school population of 857,089, there were 4,003 cases of whooping cough reported by the agency physicians. This was equivalent to an attack-rate of 46.7 per 10,000 of population. The corresponding death-rate among these Indians was 18.5 per 100,000 of population. These facts are sufficient proof that the American Indian is quite as susceptible to whooping cough as the Caucasian.


MORTALITY FROM WHOOPING COUGH, ALL AGES
NEW YORK CITY [MANHATTAN AND BRONX], 1813–1913
Rates per 10,000 Population under 10 Years of Age
Rates
65
60
55
50
45
40
35
30
25
20
15
10
5
0
Note The long horizontal ten minute decennial averages

The evidence that the negro is highly susceptible to whooping cough is even more positive than that just presented for the Indian. In Washington, D. C., the cases and deaths have been reported with distinction of color and age since April 9, 1907 and the statistics for the five-year period, 1908 to 1912, show that the attack-rate was higher for the colored than for the white population at ages under one year and also at ages one to four years. In other words the attack-rate was higher among the colored than among the white population at the period of life when whooping cough is most contagious and most fatal. In Washington, during this five-year period, 66.7 per cent. of all the reported colored cases were of ages under five years and 54.0 per cent. of the white cases were of that age period. It is quite probable that the white cases are more completely reported than are the colored cases and if this assumption is true the excess in the colored attack-rate is even higher than the statistics show. That the colored cases of whooping cough are not so completely reported as the white finds some proof in the fact that the case-mortality of the colored patients was 12.06 per cent. as against only 2.37 per cent. for the white. The case data as reported in Washington have been compiled and are presented in Table I.

In Table II the mortality from whooping cough, with distinction of color and age, is presented for five representative southern cities.

These statistics seem to prove that, beyond any question of reasonable doubt, the negro has a much higher mortality from whooping cough than the Caucasian. At ages under one year the average negro death-rate was nearly three times as high as the white death-rate. At ages one to four years the average negro death-rate was nearly five times as high as the white death-rate. Whether or not any part of this excess is to be attributed to

TABLE I.

ATTACK-RATE FROM WHOOPING COUGH BY COLOR AND AGE, WASHINGTON, D. C., 1908–1912.

(Rates per 10,000 of Population.)

Age.	White.			Colored.		
	Population.	Cases.	Rate.	Population.	Cases.	Rate.
Under 1 year	20,125	295	146.6	7,290	191	262.0
1–4 years	76,680	1,210	157.8	29,160	517	177.3
5–9 years	90,545	1,063	117.4	35,960	302	84.0
10–19 years	184,410	130	7.0	79,155	38	4.8
20 years and over	805,085	87	1.1	320,665	13	0.4
All Ages	1,180,640	2,785	23.6	472,230	1,061	22.5

TABLE II.

MORTALITY FROM WHOOPING COUGH IN FIVE SOUTHERN CITIES BY COLOR AND AGE, 1908–1912.*

(Rates per 100,000 of Population of Specified Ages.)

Ages under 1 Year.

Cities.	White.			Colored.		
	Population.	Deaths.	Rate.	Population.	Deaths.	Rate.
Baltimore, Md.	44,455	109	245.2	6,730	61	906.4
Louisville, Ky.	16,220	46	283.6	2,550	19	745.1
Memphis, Tenn.	7,330	15	204.6	3,840	19	494.8
New Orleans, La.	26,175	54	206.3	8,060	23	285.4
Washington, D. C.	20,125	37	183.9	7,290	59	809.3
Total	114,305	261	228.3	28,470	181	635.8

Ages 1 to 4.

	Population.	Deaths.	Rate.	Population.	Deaths.	Rate.
Baltimore, Md.	182,325	70	38.4	26,410	79	299.1
Louisville, Ky.	65,730	27	41.1	9,740	29	297.7
Memphis, Tenn.	27,790	5	18.0	14,805	20	135.1
New Orleans, La.	95,890	53	55.3	30,060	26	86.5
Washington, D. C.	76,680	23	30.0	29,160	61	209.2
Total	448,415	178	39.7	110,175	215	195.1

Ages 5 to 9.

	Population.	Deaths.	Rate.	Population.	Deaths.	Rate.
Baltimore, Md.	215,995	6	2.8	32,080	10	31.2
Louisville, Ky.	78,750	4	5.1	12,600	4	31.7
Memphis, Tenn.	31,530	1	3.2	18,680	3	16.1
New Orleans, La.	120,995	2	1.7	39,120	2	5.1
Washington, D. C.	90,545	3	3.3	35,960	4	11.1
Total	537,815	16	3.0	138,440	23	16.6

*These statistics are from the annual mortality reports of the Bureau of the United States Census.

TABLE II — CONTINUED.

AGES 10 AND OVER.

Cities.	White.			Colored.		
	Population.	Deaths.	Rate.	Population.	Deaths.	Rate.
Baltimore, Md.....	1,921,755	1	0.1	357,455	1	0.3
Louisville, Ky.....	755,640	—	—	176,785	—	—
Memphis, Tenn.....	323,325	—	—	224,110	—	—
New Orleans, La.....	995,460	—	—	367,780	—	—
Washington, D. C....	989,495	2	0.2	397,455	—	—
Total	4,985,675	3	0.1	1,523,585	1	0.1

ALL AGES.

	Population.	Deaths.	Rate.	Population.	Deaths.	Rate.
Baltimore, Md.....	2,366,935	186	7.9	423,745	151	35.6
Louisville, Ky.....	916,950	77	8.4	202,610	52	25.7
Memphis, Tenn.....	392,950	21	5.3	264,205	42	15.9
New Orleans, La.....	1,247,015	109	8.7	446,310	51	11.4
Washington, D. C....	1,180,640	65	5.5	472,230	124	26.3
Total	6,104,490	458	7.5	1,809,100	420	23.2

anatomical differences in the two races is beyond the scope of this paper to discuss. A careful study of the whole question would doubtless lead to important conclusions. It is of interest to note in this connection that the excessive mortality of negroes from whooping cough is not a phenomenon of recent years. In Charleston, S. C., during the period 1822 to 1848, the average annual death-rate of the colored population was 650.5 per 100,000, against a death-rate of 305.8 for the white population. The negro mortality from whooping cough in Charleston in this early period is thus shown to have been more than twice that of the white population.*

That Filipinos are susceptible to whooping cough is proved by the fact that the official reports of Manila record 60 deaths from that cause among Filipinos in that city during the decade 1904 to 1913. During the four years, 1908 to 1911, there were 6,644 deaths from whooping cough reported in the Philippine Islands, equivalent to an average annual death-rate of 30.0 per 100,000 of total population. In the Province of Negros Orientale there were 233 deaths from whooping cough reported during 1911,

*See Census of the City of Charleston, 1848, pages 237 and 245.

equivalent to a death-rate of 126.0 per 100,000 of population. In Bohol Province the death-rate was 100.0 in 1911; in Capiz, 99.1; in Iloilo, 86.3; and in Cebu Province, 64.1. The foregoing facts go far to establish the conclusion that all races of men are susceptible to whooping cough, but I may add that in Japan, during the five-year period, 1906 to 1910, no fewer than 18,414 deaths from this cause were officially reported, equivalent to an average annual death-rate of 7.4 per 100,000 of total population.

Sex and Whooping Cough.

The mortality from whooping cough is decidedly higher among female than among male children, and this excess is pronounced at all ages for which the numbers are sufficiently large to be conclusive. In Table III the mortality from whooping cough, with distinction of sex, is presented for the registration area of the United States, for the period 1900 to 1912.

The female mortality was higher than the male in every year of the period. The average excess for the six-year period, 1900 to 1905, was 24.2 per cent. and for the period 1906 to 1912, the female excess was practically the same, or 24.5 per cent.

That the mortality from whooping cough is higher among females than among males at all ages is proved by all the available data. In Massa-

TABLE III.

MORTALITY FROM WHOOPING COUGH, WITH DISTINCTION OF SEX, REGISTRATION AREA, UNITED STATES, 1900–1912.

(Rates per 100,000 of Population, all Ages.)

Years.	Males.			Females.		
	Population.	Deaths.	Rate.	Population.	Deaths.	Rate.
1900	15,415,757	1,691	11.0	15,378,516	2,028	13.2
1901	15,742,434	1,344	8.5	15,628,518	1,707	10.9
1902	16,111,848	1,707	10.6	15,917,967	2,147	13.5
1903	16,489,113	2,374	14.4	16,211,970	2,797	17.3
1904	16,856,270	967	5.7	16,492,867	1,216	7.4
1905	17,274,352	1,624	9.4	16,820,253	1,975	11.7
1906	21,322,133	2,824	13.2	20,661,286	3,500	16.9
1907	21,899,144	2,273	10.4	21,117,846	2,583	12.2
1908	23,876,529	2,243	9.4	22,913,384	2,726	11.9
1909	26,020,431	2,264	8.7	24,850,087	2,642	10.6
1910	27,606,526	2,769	10.0	26,237,370	3,377	12.9
1911	30,463,411	3,112	10.2	28,812,566	3,570	12.4
1912	31,128,193	2,531	8.1	29,298,940	3,088	10.5
1900–05	97,889,774	9,707	9.9	96,450,091	11,870	12.3
1906–11	151,188,174	15,485	10.2	144,592,539	18,398	12.7

TABLE IV.

MORTALITY FROM WHOOPING COUGH IN MASSACHUSETTS, 1909–1911, WITH DISTINCTION OF SEX AND AGE.

(Rates per 100,000 Population of Specified Ages.)

Ages at Death.	Males.			Females.			Percentage excess of female over male rate.
	Population.	Deaths.	Rate.	Population.	Deaths.	Rate.	
Under 1 year.....	107,439	219	203.8	104,763	252	240.5	18.0
1 year.....	94,689	72	76.0	91,815	81	88.2	16.1
2 years.....	102,210	16	15.7	100,485	32	31.8	102.5
3 years.....	100,371	7	7.0	99,054	8	8.1	15.7
4 years.....	93,516	7	7.5	92,316	13	14.1	88.0
Under 5 years....	498,225	321	64.4	488,433	386	79.0	22.7
5 years and over..	4,461,174	5	0.1	4,641,111	13	0.3	200.0
Total.....	4,959,399	326	6.6	5,129,544	399	7.8	18.2

chusetts the detail figures are presented for a three-year period, 1909 to 1911, in Table IV.

These statistics show that in Massachusetts the female mortality from whooping cough is substantially in excess of the male mortality from that cause, and at all ages.

In England and Wales where the mortality from whooping cough is

TABLE V.

MORTALITY FROM WHOOPING COUGH IN ENGLAND AND WALES, 1910–1912, WITH DISTINCTION OF SEX AND AGE.

(Rates per 100,000 of Population of Specified Ages.)

Age.	Males.			Females.			Percentage excess of female over male rates.
	Population.	Deaths.	Rate.	Population.	Deaths.	Rate.	
Under 1 year.....	1,185,330	5,492	463.3	1,159,854	6,417	553.3	19.4
1 year.....	1,122,327	3,241	288.8	1,106,127	4,282	387.1	34.0
2 years.....	1,187,757	1,077	90.7	1,180,128	1,600	135.6	49.5
3 years.....	1,166,007	582	49.9	1,166,046	791	67.8	35.9
4 years.....	1,146,918	299	26.1	1,142,655	467	40.9	56.7
Under 5 years....	5,808,339	10,691	184.1	5,754,810	13,557	235.6	28.0
5 years and over..	46,528,485	312	0.7	50,119,842	488	1.0	42.9
Total.....	52,336,824	11,003	21.0	55,874,652	14,045	25.1	19.5

considerably higher than in this country the same sex difference is observable. In Table V the statistics are presented for the three-year period, 1910 to 1912.

In Bavaria the mortality from whooping cough is higher than in England and the same excess of female over male mortality has been noted there. The following data are, therefore, interesting as confirming the American and English experience:

MORTALITY FROM WHOOPING COUGH IN BAVARIA BY AGE AND SEX, 1893–1902.*

(Rates per 100,000 Population.)

Ages.	Males.	Females.	Percentage excess of female over male rates.
Under 1 year	674.0	771.0	14.4
1 year.....	295.0	394.0	33.6
2–4 years....	38.0	60.0	57.9
5–9 years....	3.9	6.4	64.1
10–14 years..	0.2	0.3	50.0

* From article by Prof. E. Feer in Medizinische Klinik, Berlin, May, 1914.

The foregoing statistics confirm the following statement made by Creighton in his "History of Epidemics in Britain": "No other epidemic malady has shown the same excess of female deaths in proportion to the numbers of the sex living." He adds the following significant statement as a possible explanation of this sex difference: "The singular difference between the sexes in this respect is almost certainly related to the corresponding differences in the formation and development of the larynx, the organ which gives character, at least, to the convulsive cough of children. The expansion of the larynx in boys, which becomes so obvious at puberty and remains so distinctive of the male sex, is one of those secondary sexual characters which begin to differentiate quite early in life, and are probably congenital to some extent. It is not known whether female children are more often attacked than males; but it is probable that they are predisposed both to acquire coughs of the convulsive, suffocative kind and to have their lives shattered by the attack—for the same anatomical and physiological reasons, namely, the imperfect development of the posterior space of the glottis with the spasmodic closure by reflex action."

Age and Whooping Cough.

In three of the foregoing tables illustrating the sex differences in whooping cough mortality the relative death-rates at various ages are also indicated. In Massachusetts the death-rate for both sexes in the first year of life was far higher than at any subsequent age. The death-rate for both sexes in Massachusetts in the first year of life was more than two and one-half times the rate in the second year of life, or for males, 203.8 in the first year of life, against 76.0 in the second, and for females, 240.5 in the first year of life, against 88.2 in the second. The great majority of the deaths of both sexes occurred in the first three years of life, not more than 2 or 3 per cent. of the total mortality occurring at ages five years and over. In England and Wales the death-rate

is also considerably higher in the first year of life than in the second, and this is true of both sexes. The death-rate rapidly diminishes after age two and is almost negligible at the adult ages. In England, as in Massachusetts, less than 5 per cent. of all the deaths from whooping cough occur at ages five years and over.

The mortality from whooping cough in the registration area of the United States is available in considerable detail for ages under five years for the three-year period, 1910 to 1912. A summary of the facts, together with a comparison with the mortality from measles, is presented in the following table:

TABLE VI.

COMPARATIVE MORTALITY FROM WHOOPING COUGH AND MEASLES, BY AGE AT DEATH, REGISTRATION AREA, UNITED STATES, 1910-1912.

Ages at Death.	Whooping Cough.		Measles.	
	Number of deaths.	Distribution on basis of 1,000 deaths, all ages.	Number of deaths.	Distribution on basis of 1,000 deaths, all ages.
Less than 1 day	1	0.1	14	0.9
1 day	4	0.2	5	0.3
2 days	3	0.2	2	0.1
3 to 6 days	21	1.1	15	0.9
Less than 1 week	29	1.6	36	2.2
1 week	54	2.9	55	3.3
2 weeks	239	13.0	69	4.1
3 weeks but less than 1 month	403	21.8	52	3.1
Less than 1 month	725	39.3	212	12.7
1 month	1,441	78.2	153	9.1
2 months	1,249	67.7	131	7.8
3 to 5 months	2,516	136.5	502	30.0
6 to 8 months	2,310	125.3	1,221	72.9
9 to 11 months	1,992	108.0	1,710	102.0
Under 1 year	10,233	555.0	3,929	234.5
1 year	4,313	233.9	5,303	316.5
2 years	1,736	94.2	2,410	143.8
3 years	840	45.6	1,171	69.9
4 years	465	25.2	696	41.5
5 to 9 years	673	36.5	1,418	84.7
10 to 19 years	89	4.8	687	41.0
20 years and over	89	4.8	1,141	68.1
Total, known ages	18,438	1,000.0	16,755	1,000.0

This comparison brings out some interesting facts. For illustration, it is shown that whooping cough is even more fatal at the very young ages than is measles. In the whooping cough mortality 39.3 deaths in every 1,000 were at ages under one month as against 12.6 deaths at the same ages among every 1,000 deaths from measles; for ages under three months the relative proportions in every 1,000 deaths, all ages, were for whooping cough 185.1, as against 29.5 for measles. Similarly, in the mortality from whooping cough, 554.7 out of every 1,000 deaths were under one year of age, against 234.4 for measles; and at ages under five the relative proportions were 953.4 for whooping cough as against 806.0 for measles. In other words, on the basis of the mortality in the registration area of the United States, 95.3 per cent. of all the deaths from whooping cough occurred at ages under five years, as against 80.6 per cent. for measles. These facts quite clearly indicate that whooping cough and its complications are even more fatal at the very early ages than are measles and its complications.

Whooping Cough and the Mortality from all Causes.

The proportion of the total mortality which is chargeable to whooping cough varies considerably with age, as the following tables show:

PROPORTIONATE MORTALITY FROM WHOOPING COUGH, REGISTRATION AREA, UNITED STATES, 1910–1912.

Age.	Deaths from		Percentage of the total mortality due to whooping cough.
	All causes.	Whooping cough.	
Under 6 mos. . .	346,671	5,931	1.71
6 to 11 mos. . . .	104,479	4,302	4.12
Under 1 year . . .	451,150	10,233	2.27
1 year	94,155	4,313	4.58
2 years	41,496	1,736	4.18
3 years	25,976	840	3.23
4 years	18,663	465	2.49
Under 5 years . .	631,440	17,587	2.79
5–9 years	53,329	673	1.26
10 yrs. and over	1,794,971	178	0.01
Ages unknown .	3,207	9	—
All ages	2,482,947	18,447	0.74

PROPORTIONATE MORTALITY FROM WHOOPING COUGH, ENGLAND AND WALES, 1910–1912.

Age.	Deaths from		Percentage of the total mortality due to whooping cough.
	All causes.	Whooping cough.	
Under 6 mos. . .	211,831	5,477	2.59
6 to 11 mos. . . .	80,127	6,432	8.03
Under 1 year . . .	291,958	11,909	4.08
1 year	79,865	7,523	9.42
2 years	31,514	2,677	8.49
3 years	19,026	1,373	7.22
4 years	13,627	766	5.62
Under 5 years . .	435,990	24,248	5.56
5–9 years	35,370	750	2.12
10 yrs. and over	1,026,636	50	0.005
All ages	1,497,996	25,048	1.67

These tables, based upon large numbers, indicate quite clearly that whooping cough, relatively to the total mortality from all causes, is most important in the second year of life. It is also an important factor in the total mortality in the second half of the first year of life, or at ages 6 to 11 months, inclusive. After age five the deaths from whooping cough form an ever-decreasing percentage of the total mortality, and at ages over ten they are an almost negligible factor. These facts are brought out in a graphic manner in the chart on page 1007, showing the mortality from whooping cough in the Registration Area of the United States.

Case Mortality in Relation to Age and Sex.

Exact knowledge of the average comparative fatality of whooping cough cases, with distinction of age and sex, is not available from statistics compiled in this country. The most extensive data in this connection seem to be those for Aberdeen, Scotland, and these are available in the excellent report by James S. Laing, M. D., D. P. H., and Prof. Matthew Hay, M. D., entitled *Whooping Cough: Its Prevalence and Mortality in Aberdeen*, which was published in 1902. The statistics for Aberdeen were as follows:

TABLE VII.

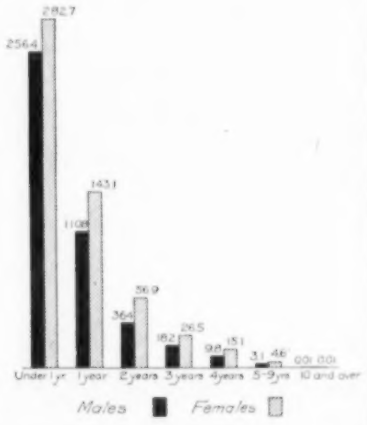
CASE-MORTALITY FROM WHOOPING COUGH IN ABERDEEN, SCOTLAND, WITH DISTINCTION OF AGE AND SEX, 1891–1900.

Age.	Males.			Females.		
	Cases.	Deaths.	Deaths in every 100 cases.	Cases.	Deaths.	Deaths in every 100 cases.
Under 3 mos.	177	20	11.3	163	32	19.6
3–5 mos.	359	47	12.4	346	43	13.0
6–8 mos.	396	40	10.1	407	48	11.8
9–11 mos.	324	48	14.8	320	25	7.8
Under 1 year	1,256	165	13.1	1,236	148	11.9
1 year	1,114	107	9.6	1,213	128	10.5
2 years	1,128	35	3.1	1,169	41	3.5
3 years	1,010	23	2.2	1,119	25	2.2
4 years	847	15	1.7	961	15	1.5
5 years	836	3	0.3	840	6	0.7
6 years	561	—	—	602	8	1.3
7 years	288	—	—	296	1	0.3
8 years	105	—	—	161	1	0.6
9 years	54	—	—	60	—	—
10 years and over	79	—	—	158	1	0.6
All ages	7,278	348	4.7	7,815	374	4.7

MORTALITY FROM WHOOPING COUGH
UNITED STATES REGISTRATION AREA

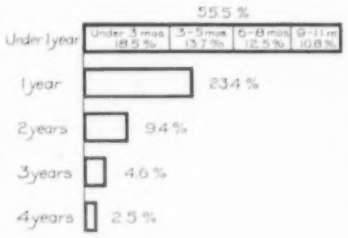
Mortality by Age and Sex
1908-1912

Rates per 100,000 population of specified ages



Age Distribution of Deaths
1910-1912

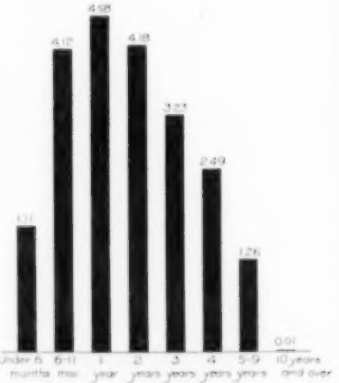
Percentage distribution of deaths from whooping cough



Only 46 percent of all deaths from whooping cough occurred at ages 5 years and over.

Percentage of Total Mortality
1910-1912

Deaths from whooping cough per 100 deaths from all causes



These statistics seem to indicate that the higher mortality of the female sex is due to the greater number of cases, rather than to the more fatal character of the disease among females. In Aberdeen the case mortality was practically the same for both sexes when due regard is had to the smallness of the numbers at the ages where variations were considerable. When all ages are combined the case-mortality ratio was the same for both sexes, or 4.7 per cent. The Aberdeen statistics show whooping cough cases to be most fatal in the first year of life and the ratio of fatal to total cases is high also in the first three months of life, being quite exceptionally so for females, or 19.6 per cent. These Aberdeen data are a valuable contribution to the statistics of whooping cough, but they require to be supplemented with similar data for other cities before many final conclusions can be deduced as to case-mortality in whooping cough.

Urban vs. Rural Mortality from Whooping Cough.

The urban death-rates from whooping cough do not appear to compare so unfavorably with the rural death-rates as is true in the mortality from measles. Table VIII, based upon statistics of Registration States, seems to indicate that the death-rate at the present time is appreciably higher in the rural than in the urban area.

Decline in the Mortality from Whooping Cough.

It is a fact well known to medical practitioners and sanitarians that whooping cough, like measles, is a disease the spread of which is exceedingly difficult to control because it is highly contagious at a stage when its certain diagnosis is almost if not quite impossible. The fatality of whooping cough is, however, largely subject to control through the proper care and treatment of the patients. That there has been a general improvement in this respect

TABLE VIII.

MORTALITY FROM WHOOPING COUGH IN RURAL AND URBAN AREAS, REGISTRATION STATES, UNITED STATES, 1900–1912.

Years.	Rural.			Urban.		
	Population.	Deaths.	Rates per 100,000 population.	Population.	Deaths.	Rates per 100,000 population.
1900–1905	55,487,515	4,908	8.8	69,498,082	8,045	11.6
1906–1911	120,535,968	14,318	11.9	133,089,503	15,249	11.5
1900–1911	176,023,483	19,226	10.9	202,587,585	23,294	11.5
1912	27,102,779	2,831	10.4	27,694,590	2,288	8.3

is apparent when we review the world statistics of the mortality from this disease. In seventeen countries where a comparison of the mortality was possible between five-year periods, separated by an interval of twenty years, no fewer than fourteen of the countries showed decreases in the mortality-rates from whooping cough and only three, Jamaica, Norway and the Province of Ontario, Can., showed higher rates in the recent than in the earlier five-year period. A summary of this comparison is presented in Table IX.

A world-wide comparison of the mortality from whooping cough during 1883 to 1887 and during the last five-year period available discloses the fact that within the last quarter of a century there has been a reduction in the average death-rate from 52.4 per 100,000 of population to 23.8, which represents an actual decrease of 28.6 in the rate, equivalent to 54.6 per cent.

For the state of Massachusetts it is possible to compare the mortality from whooping cough by decades for a half-century with distinction of sex. This comparison is limited to population and deaths of ages under five years, for fully 95 per cent. of the total mortality is at this early age.

The data in Table X indicate that

TABLE IX.

COMPARATIVE MORTALITY FROM WHOOPING COUGH IN SEVENTEEN COUNTRIES.

Country.	1883–1887.			1908–1912.			Increase or decrease in rate.
	Population.	Deaths.	Rate.	Population.	Deaths.	Rate.	
Australia	13,327,248	2,351	17.6	21,974,430	1,574	7.2	−10.4
Austria	114,323,956	119,206	104.3	142,091,028	47,036	33.1	−71.2
Belgium	29,243,761	19,056	65.2	37,070,103	11,650	31.4	−33.8
Ceylon	14,076,141	391	2.8	20,200,235	382	1.9	− 0.9
Denmark	10,382,000	1,351	13.0	13,678,000	1,336	9.8	− 3.2
England and Wales	136,120,085	59,240	43.5	178,978,660	42,081	23.5	−20.0
Ireland	24,699,974	7,916	32.0	21,925,004	5,277	24.1	− 7.9
Jamaica	2,989,079	3	0.1	4,220,187	1,505	35.7	+35.6
Massachusetts	9,793,350	1,234	12.6	16,832,078	1,941	11.5	− 1.1
Netherlands	21,542,127	6,444	29.9	29,602,284	5,663	19.1	−10.8
New Zealand	2,833,735	774	27.3	4,963,561	258	5.2	−22.1
Norway	9,694,600	1,324	13.7	11,683,500	1,680	14.4	+ 0.7
Ontario	9,000,000	798	8.9	11,805,519	1,282	10.9	+ 2.0
Prussia	141,183,802	72,663	51.4	199,629,445	47,584	23.8	−27.6
Scotland	19,282,219	12,730	66.0	23,528,940	10,190	43.3	−22.7
Sweden	23,305,010	4,159	17.8	27,029,454	3,940	14.6	− 3.2
Switzerland	14,480,395	2,944	20.3	18,458,916	2,903	15.7	− 4.6
Total	596,277,482	312,584	52.4	783,671,344	186,282	23.8	−28.6

the mortality from whooping cough has declined by more than 50 per cent. when the average death-rate of 1903 to 1912 is compared with that of 1863 to 1872. This reduction has been fairly constant from decade to decade; it has been equally rapid and constant for both sexes, and, finally, this table again illustrates the excessive mortality of the female as compared with the male sex. In Massachusetts this excess has been from 20 to 30 per cent. throughout the fifty-year period.

In the following table and chart on page 1007, there is presented a convenient summary of the statistics of whooping cough at the most fatal ages, under five, for ten representative cities for a thirty-year period. The rates are based upon estimated populations under five years of age. It may be added that of the aggregate mortality from whooping cough in these ten cities during the thirty-year period, 97.0 per cent. of the deaths occurred at ages under five.

Table XI brings out quite clearly the important fact that the mortality from whooping cough in any given locality is a very fluctuating factor. The range in the sixty quinquennial average rates was from 50.0 for Cleveland, 1898 to 1902, to 367.4 for Washington, D. C., 1898 to 1902. On the other hand, when the mortality for the ten cities is combined it is shown that in the aggregate there has been a continuous decline in the death-rate during the thirty-year period. The decline was very slight from 1883–1887 to 1888–1892, but subsequently to the latter period the rate has declined rapidly to 157.3 during 1893–1897, to 129.3 during 1898–1902, to 106.0 during 1903–1907, and finally, to 78.4 during 1908–1912.

A Century of Whooping Cough Mortality in New York City.

For New York City whooping cough mortality data are available during a period of more than a century and they indicate that there has been a pronounced decline in the death-rate

TABLE X.

MORTALITY FROM WHOOPING COUGH IN MASSACHUSETTS, AGES UNDER FIVE, WITH DISTINCTION OF SEX, 1863–1912.

Periods.	Males.			Females.		
	Population.	Deaths.	Rates per 100,000 population.	Population.	Deaths.	Rates per 100,000 population.
1863–1872	732,139	1,250	170.7	729,437	1,577	216.2
1873–1882	878,511	1,244	141.6	874,733	1,548	177.0
1883–1892	970,953	1,160	119.5	959,212	1,382	144.1
1893–1902	1,287,603	1,282	99.6	1,273,734	1,622	127.3
1903–1912	1,528,611	1,211	79.2	1,498,325	1,544	103.0
1863–1912	5,397,817	6,147	113.9	5,335,441	7,673	143.8

MORTALITY FROM WHOOPING COUGH
FIFTEEN REPRESENTATIVE AMERICAN CITIES

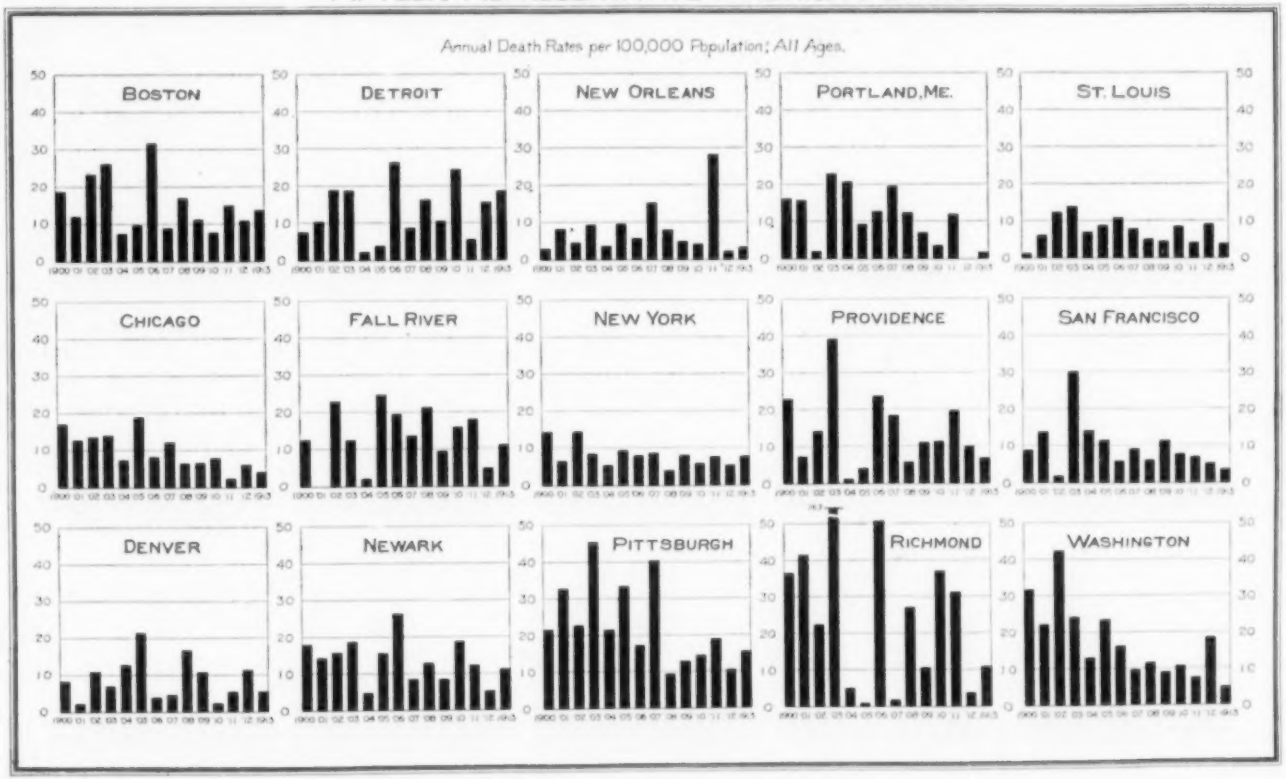


TABLE XI.

DEATH-RATES FROM WHOOPING COUGH IN TEN AMERICAN CITIES, 1883–1912.

(Rates per 100,000 Population, Ages under Five Years.)

Cities.	1883–87.	1888–92.	1893–97.	1898–02.	1903–07.	1908–12.
Boston, Mass.	194.4	141.7	121.6	154.1	160.6	122.4
Cleveland, Ohio	97.8	131.8	85.7	50.0	75.6	69.4
New Haven, Conn.	243.8	193.6	185.4	241.7	141.1	125.5
New York City, N. Y.	271.8	281.9	198.8	123.8	68.4	55.7
Philadelphia, Pa.	112.0	123.0	161.9	128.0	176.4	122.8
Providence, R. I.	172.3	269.0	183.4	214.1	168.2	116.4
Reading, Pa.	85.5	43.3	43.9	108.4	81.5	50.3
St. Louis, Mo.	79.0	75.9	82.7	69.7	98.0	62.6
San Francisco, Cal.	116.4	97.2	77.6	117.6	183.4	102.8
Washington, D. C.	334.9	309.0	235.7	367.4	195.1	135.0
Total	188.8	188.1	157.3	129.3	106.0	78.4

from that cause. The decline, however, has not been constant, and in fact the reduction has mainly occurred subsequent to 1889. The following table together with the accompanying chart, present an adequate summary of the mortality from whooping cough in New York City during the century interval, 1813 to 1913.

THE MORTALITY FROM WHOOPING COUGH IN NEW YORK CITY (MANHATTAN AND BRONX BOROUGHS), 1813–1913.

(Death-Rates per 10,000 of Population, Ages under Ten Years.)

Periods.	Population, ages under 10 years.	Deaths, all ages.	Death-rate.
1813–1822	333,628	613	18.4
1823–1832	519,060	953	18.4
1833–1842	752,311	1,296	17.2
1843–1852	1,118,502	1,421	12.7
1853–1862	1,786,183	2,680	15.0
1863–1872	2,243,716	2,613	11.4
1873–1882	2,493,640	4,150	16.6
1883–1892	2,961,475	4,505	15.2
1893–1902	4,036,476	3,707	9.2
1903–1912	4,995,345	1,938	3.9
1913	544,112	420	7.7

The mortality includes deaths at all ages, but the number of deaths at ages above ten years is so small as not appreciably to affect the death-rates as here calculated upon the population of ages under ten years. The mortality, with distinction of age, is not available for the hundred-year period.

WHOOPING COUGH AND ITS COMPLICATIONS.

As with measles the fatal termination of a case of whooping cough is usually the result of a complication with some other malady. In 1,000 fatal cases drawn from the experience of The Prudential Insurance Company of America the results are shown in Table XII.

In this investigation single years of life were considered up to and including the fifth, but the variations in the character of the complications were not essentially different at the various ages except in respect of the respiratory and digestive complications. The

TABLE XII.

ONE THOUSAND FATAL CASES OF WHOOPING COUGH, SHOWING PRIMARY COMPLICATIONS.

(Prudential Industrial Mortality Experience, 1911–1913.)

Complications.	Males.		Females.		Both Sexes.	
	Number of deaths.	Per cent. distribution.	Number of deaths.	Per cent. distribution.	Number of deaths.	Per cent. distribution.
Broncho-pneumonia	140	28.3	146	28.8	286	28.6
Pneumonia	125	25.3	145	28.6	270	27.0
Bronchitis	28	5.7	28	5.5	56	5.6
Other respiratory diseases	10	2.0	5	1.0	15	1.5
Meningitis	27	5.5	17	3.4	44	4.4
Cerebral congestion	3	0.6	6	1.2	9	0.9
Heart complications	10	2.0	15	3.0	25	2.5
Digestive complications	43	8.7	36	7.1	79	7.9
Nephritis	2	0.4	6	1.2	8	0.8
Dysentery	—	—	6	1.2	6	0.6
Tuberculosis of lungs	4	0.8	5	1.0	9	0.9
Other miscellaneous	22	4.5	23	4.6	45	4.5
No complications	80	16.2	68	13.4	148	14.8
Total	494	100.0	506	100.0	1000	100.0

details of these in summary form are shown in Table XIII.

In the Prudential Industrial mortality experience the digestive complications were relatively most important in the second year of life and the respiratory complications were relatively most important in the fifth year of life, ranging from 58.5 per cent. of the deaths at age 1, to 80.3 per cent. at age 4.

Attack Incidence of Whooping Cough.

The attack-rate of whooping cough seems, from such limited data as are available, to be highest in the spring months, and lowest in the autumn months. This was true in Aberdeen, Scotland, where this disease was notifiable during a twenty-year period, 1883 to 1902. It is also true for New York City and Philadelphia as is evident from the accompanying chart on page 1015 showing the average case-rates per 100,000 of population of ages under ten years during the seven-year period, 1906 to 1912.

The Aberdeen data show that females have a higher susceptibility to whooping cough than males, and this sex difference holds true at all ages.

TABLE XIII.

DEATHS COMPLICATED WITH RESPIRATORY AND DIGESTIVE DISEASES—ONE THOUSAND DEATHS FROM WHOOPING COUGH.

(Prudential Industrial Mortality Experience, 1911–1913.)

Age.	Total of whooping cough deaths.	With respiratory complications.		With digestive complications.	
		Number of deaths.	Per cent. of total.	Number of deaths.	Per cent. of total.
1 year	543	318	58.5	66	12.2
2 years	184	120	65.2	6	3.3
3 years	126	83	65.9	5	4.0
4 years	56	45	80.3	—	—
5–9 years	81	56	69.2	1	1.2
10–19 years	9	5	55.6	1	11.1
20 years and over	1	—	—	—	—
Total	1,000	627	62.7	79	7.9

The difference is most pronounced, however, at ages under four years. The attack-rates in Aberdeen, with distinction of age and sex, are presented in Table XIV.

At every age, up to the fifteenth year of life when the number of cases was very small, there was a pronouncedly higher attack-rate among females than among males. The attack-rate was highest for males in the second year of life and it was highest for females in the third year of life.

In the Aberdeen investigation of whooping cough a careful attempt was made to learn whether or not the patient was suffering from a first or second attack. On the basis of 15,094 cases, of which 7,278 were males and 7,816 were females, it was found that the reported second attacks numbered only 2.6 in a thousand for both sexes combined, 1.5 per thousand for males, and 3.7 per thousand for females. The greater liability of females to second attacks held true for all ages.

Control of Whooping Cough.

It is impossible to say how much sickness is caused by whooping cough in any given year in the United States, or in any other country. In fact it is doubtful if exact knowledge on this point is at present available for any city in the world. The reporting of this disease, even under compulsory notification laws, has thus far proved to be quite unsatisfactory because of incomplete registration. Thus far this disease has presented almost insuper-

AVERAGE WEEKLY CASE RATES FROM WHOOPING COUGH
NEW YORK CITY AND PHILADELPHIA. 1906–1912

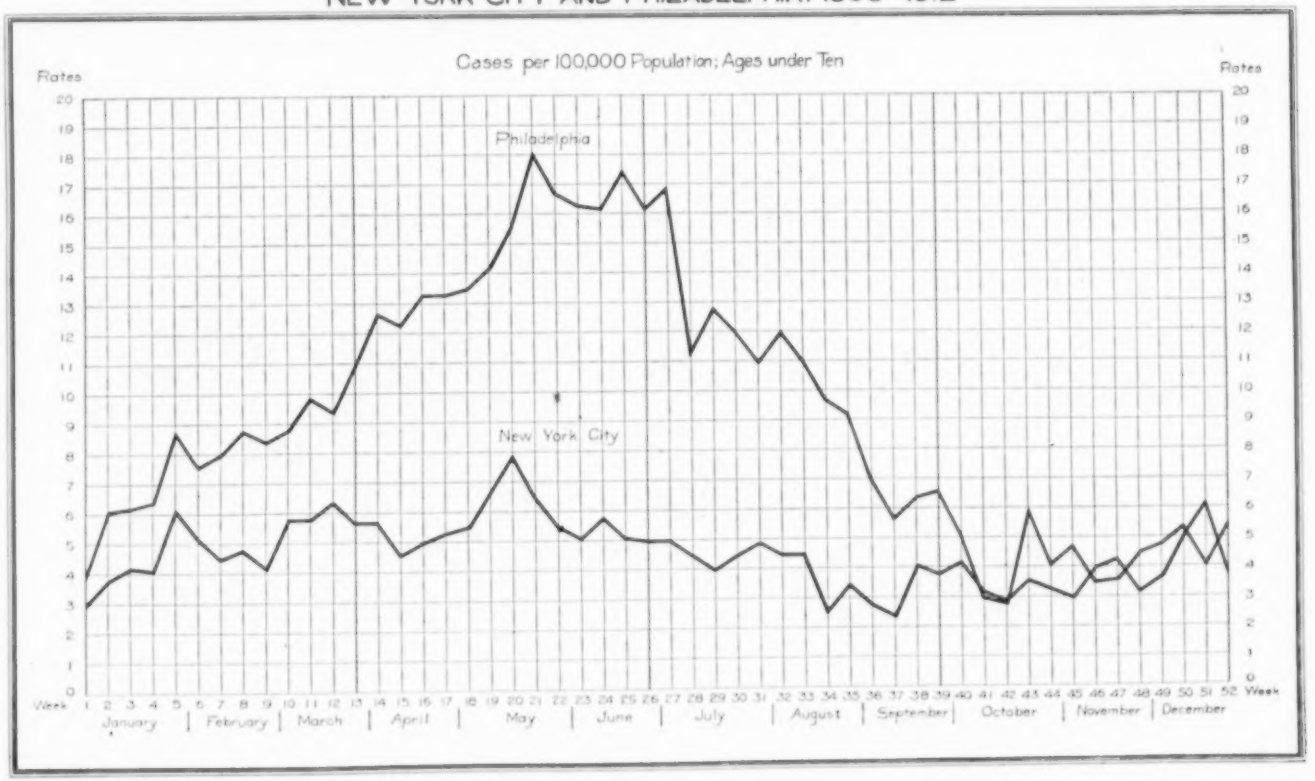


TABLE XIV.

WHOOPING COUGH ATTACKS PER 1,000 OF POPULATION WITH DISTINCTION OF AGE AND SEX, ABERDEEN, SCOTLAND, 1891–1900.

Age.	Males.	Females.	Excess of female over male rates.	
			Actual.	Percentage.
Under 1 year	65.7	73.6	7.9	12.0
1 year	68.6	79.0	10.4	15.2
2 years	66.5	80.8	14.3	21.5
3 years	58.7	70.9	12.2	20.8
4 years	49.7	59.4	9.7	19.5
5 years	50.7	53.7	3.0	5.9
6 years	33.5	39.7	6.2	18.5
7 years	18.6	19.2	0.6	3.2
8 years	6.8	10.3	3.5	51.5
9 years	3.6	4.1	0.5	13.9
10 years	1.6	2.0	0.4	25.0
11 years	1.1	1.7	0.6	54.5
12 years	0.5	0.9	0.4	80.0
13 years	0.5	0.9	0.4	80.0
14 years	0.3	0.2	-0.1	-33.3

able difficulties in the way of accurate and complete registration. Chief of these, perhaps, is the fact that many cases are never attended by a physician, and another serious difficulty arises from the fact that many cases are not diagnosed as whooping cough, particularly when the patients are so young or so old that the disease does not present its characteristic whoop.

The early diagnosis of whooping cough is difficult, and sometimes almost impossible even to capable physicians, and, when to this difficulty is added the fact that this disease is most contagious in its early or catarrhal stage, it can readily be seen that we have a combination of conditions which operate strongly against any efficient control. The best hope for good results in this direction seems to lie along educational lines. Physicians, nurses, school teachers, parents and the older children need more information as to the signs by which the disease can be detected and what to do when it is discovered. The necessity of isolation and quarantine of the non-immune, including house placarding and plain tagging of patients when out of doors, does not thus far appear to have received the attention which they deserve.

The statistics of this disease teach that whooping cough requires much more careful study than it has ever yet received; that it is still surrounded by a hazy nimbus composed partly of igno-

rance and partly of half-knowledge; that it is a disease the mortality from which entitles it to more serious attention than it usually receives at the hands of both physicians and parents; and, finally, that there is a great need for intensive statistical investigations conducted by properly qualified investigators—investigations which shall extend from the patient to the laboratory and embrace every item to which the statistical method of analysis is applicable. Such investigations, if properly conducted and if given sufficient publicity, would undoubtedly go far to remove the present widespread ignorance of this disease, the fatal result of which is so adequately expressed by Anders in his "Practice of Medicine" when he states that "The gravity of pertussis is scarcely appreciated either by the general physician or the public, and there is more criminal neglect in connection with whooping cough than with any other disease."*

*James M. Anders, M.D., Practice of Medicine, Philadelphia, 1910, p. 227.

IMPORTANT DETAILS OF PRACTICAL PLUMBING.

HARRY Y. CARSON,
New York City.

Read before the Engineering Section of the American Public Health Association, Jacksonville, Fla., December 3, 1914.

AS a branch of building construction and of modern sanitation, plumbing is demanding more attention each year. This is strongly emphasized when we realize that out of approximately two billion dollars' worth of building materials of all descriptions sold annually in the United States, nearly 69 millions are spent each year for plumbing, as compared with 62 millions for structural steel, 90 millions for bricks, about 100 millions for paint.

GROWTH AND IMPORTANCE OF PLUMBING.

It is worthy of note that many large modern structures accommodate 10,000 to 20,000 people and often in congested districts twice this number may use a single building daily. Many of our present-day hotels house the population of a fair sized town and even the residences of many wealthy folk with their army of attendants and servants attain the magnitude of villages.

In addition to this massing of the people into urban districts, there is a growing demand for personal cleanliness and we now install many plumbing fixtures where one, or even the old privy vault of a few decades ago, was considered a luxury. Immeasurable benefits have been derived from the lavish uses of water and plumbing fixtures. Much of the hard drudgery imposed upon house-wives has been eliminated by the kitchen sink and the laundry tub and our whole system of living has been safeguarded against the inroads of disease which in past years put whole cities or whole nations temporarily out of commission. Plumbing is accountable for a large share of these better living conditions. But in spite of all this, house drainage work is just being given serious consideration by capable engineers.

The plumbing work of large modern buildings comprises in reality the water supply and the sewage disposal systems for communities that equal or even exceed many small cities. Many of our large buildings pump their supply of water from private or public sources and the sewage is sometimes treated in sterilizing tanks before dumping it into the public sewers. All this calls for a high class of sanitary engineering skill which, unfortunately, is at present lacking.

PLUMBING LAWS INCOMPLETE IN SCOPE.

Our plumbing laws are, to a very large extent, based upon unscientific, and erroneous, principles. They are full of errors and look as if they have emerged from some dark alley of thought. Beyond a doubt, our city and state public health rules must come to be framed with equally painstaking care for the sewerage systems of such large buildings which accommodate many thousands of people, as for the sewerage system of towns or cities of equally populous districts.

There are many who condemn present-day plumbing practice but few

who are willing to work out remedies. Very seldom the same care is exercised in the specifications of plumbing work as for instance is common with the steel beams and columns of our buildings. Yet the failure of the plumbing is quite as serious an economical question as the failure of the structural framework.

Often the burden of responsibilities is thrown upon the city authorities by the all-inclusive clause: "The plumbing work shall be installed in strict accordance with the rules and regulations of the city health authorities." Thus the engineer relieves his mind of these complicating problems, and is glad to be rid of them.

In view of such a condition we, therefore, must look to our public health boards for meeting the situation. There is undoubtedly a large amount of public and private capital that is uselessly expended every year on account of the un-engineering method (if we may use this term) of installing plumbing. I have in mind such costly items as the main house traps, which in spite of the fact that capable men have shown them to be a nuisance, still exist in our regulations, presumably on account of old ideas regarding the composition of sewer air. These details should, at least, warrant the attention of the sanitarians with whom broad police powers have been granted to safeguard our welfare.

We must come to study the problems with a view toward a better and a more clearly defined legislation.

In the past much energy has been expended in discussing minor details of plumbing work, such as whether this or that make of fixture trap is proper or "dangerous," and whether one method of venting should be used in buildings to the exclusion of all other methods. At the same time many of the major short-comings of plumbing, such as the enormous waste of the municipal water supply through defective fixtures and the defects in the house sewers (which let ground water into the sanitary sewers) are not even considered when the plumbing laws of our cities and towns are being framed or revised. To improve matters materially, we must influence some of those major public expenses and bring about the greatest economy to the owners of property and to the public without permitting or allowing anyone to create conditions that may cause public nuisances.

Space does not permit of our going into a full discussion of all these details because such would lead us deeply into economics and the general effect of plumbing sanitation upon the public health, but it is the purpose of this paper to merely mention a few of these important items.

Tile House Sewers Source of Ground Water in Sanitary Sewers.

In practice it seldom happens that a house sewer is constructed as carefully as the main sanitary sewers in the streets. The branches leading into the houses from *Y* fittings in the trunk lines have a total length, when taken collectively, far greater than the main lines. These branch lines to the house should be, *but unfortunately are not*, the most carefully constructed parts of the whole sewerage system. These main house sewers, which are continuations of the house drainage system, are put

in by the plumber or owner at "any old gradient" and sometimes without a single cemented joint. Invariably the settlement of the soil, which is usually loosely packed about the house sewers, causes these lines to sag and open up still more at the joints. Defective joints allow the ground water and seepage from the buildings to flow into the sewers along with the household wastes. The evil effects of ground water in the sanitary sewerage system and the consequent added cost to the community are too well known for repetition here. Edward D. Rich has compiled data for a sewage flow chart showing the typical flow at small sewage disposal plants during the several months of the year. This chart demonstrates the importance of keeping ground water out of the system. It can be noticed that during the wet seasons of the year when the ground water level rises considerably above the sewers there is an enormous increase in the quantity of the sewage handled by the system and this, of course, adds a large extra cost to the community as a whole. One other effect of this leakage is the possibility of soil pollution in the immediate vicinity of the sewers, but this is not likely to have any serious effect upon the larger problem of sewage disposal, although it may affect water supplies. Also the roots of lawn trees often enter and clog such sewers. A remedy for these difficulties can be found by insisting that the property owners extend the main house drain, which is of iron, to the main tile sewer in the street or alley. It is also essential to make a thoroughly tight joint with the main sewer and thus eliminate most of the trouble from ground water in sewage disposal systems.

Materials Best Suited.

In this connection we might dwell very briefly upon the question of materials from which the drainage pipes and house sewers should be constructed. Well made vitrified sewer pipe will undoubtedly last longer than any other kind of pipe but is unsuited to withstand temperature stresses from alternate hot and cold sewage or settling and shifting of the line due to soil movement, settlements of buildings and root growths. However, as properly made extra heavy cast iron soil pipe with leaded joints is known to have lasted much longer than the expected life of modern structures, it may be relied upon to maintain a thoroughly water tight sewer line between the plumbing fixtures and the sanitary sewer. Other forms of iron pipe, such as wrought steel, are more suited to withstand conditions where excessive tensile stresses are met in practice, but have such a short life that provision must be made for their frequent replacing. Wrought pipe is expensive and rusts out.

Curtailment of Public Water Waste.

Another point of vital importance is the curtailment of our enormous water waste. It is common knowledge among water supply engineers that an enormous amount of public water (sometimes as much as a fourth of the total consumption) is wasted through bad types of plumbing fixtures. Metering individual services does not prevent the loss, although it makes it possible for the water corporation to more accurately adjust the charges against consumers. In this respect the matter of good and bad types of plumbing

fixtures in common use at the present time must be considered. The plumbing laws must point out to the public which types are bad, but special provision must be made to eliminate improper plumbing equipment which may cause an unnecessary waste of water down the sewer. Another source of water waste in cold climates is that used in winter to prevent pipes from freezing. In poorly heated houses a faucet is commonly left running continuously at full stream to prevent some uncovered water pipe from freezing. Much can be done to eliminate this source of waste if the water lines as well as the drainage lines of new work are carefully inspected by a capable plumbing expert. To my best knowledge no plumbing code in this country properly provides for this phase of plumbing inspection. Another very important item is the water wasted annually through the defective service connections, poor jointing of pipe, and the injudicious selection of piping material. A large part of these useless water wastes belong to the realm of bad plumbing.

Requirements for Public Plumbing.

For public and semi-public plumbing such as comfort stations, bath houses, railway and office toilet rooms or public school plumbing, our laws must explicitly and clearly define the practices. The toilet rooms designed for public or semi-public use should contain the most sanitary types of plumbing fixtures and plumbing materials obtainable. The rooms should be so located that sunlight can shine directly into them. The volume of air in each toilet should be regularly and completely changed at least four times each hour when in use. Wood floors and walls plastered with a soft porous finish are a constant source of foulness; and, where toilet rooms so constructed are put to hard use, they not only become a nuisance but are often a serious danger to those who must use them. The toilet rooms should have impervious floors and walls. All fixtures and partitions should be smooth of finish, light in color and impervious to moisture. Every public toilet room should be equipped with a hose cock and floor drain so that the entire room and fixtures may be easily and quickly washed down with a hose.

Summary.

In summing up, let me say that modern plumbing work presents complicated engineering problems which indeed are as important to our future welfare as the building of useful and safe structures.

The acquirement of plumbing has been so rapid that practice in different parts of the country varies a great deal. The draining of large buildings presents big engineering problems which become more and more complicated as we develop other lines of endeavor. The solution of these problems have unfortunately been left largely to the artifices of rule of thumb methods. We all regret to see such unfortunate conditions prevailing in such an opportune and fruitful field, but the time must come when, for economic reasons alone, our present practice of plumbing will expand into an important branch of engineering. We will then probably come to look upon it as "Plumbing Engineering" which is really a more descriptive name.

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THE ROCHESTER MEETINGS.

The 1915 meetings of the American Public Health Association held last month were in many ways unique in the history of the Association. There was a record attendance of 477 members, 122 more than at any previous meeting! With these members and the throngs of New York state health officers it made, indeed, a splendid gathering. The meeting was graced by the presence of the founder and first president of the Association, Doctor Stephen Smith of New York City. None who were present at the memorable meeting in Convention Hall will forget the wonderful reception accorded to Dr. Smith on his taking his place on the platform.

Much of importance transpired at the meetings; the scientific programs were unusually interesting and well attended; a new constitution and by-laws were adopted; and a new Board of Directors representing all parts of the countries included in the Association appointed. In addition one might mention the splendid address of the president, Prof. William T. Sedgwick; the unanimous election of Dr. John F. Anderson as president for the coming year; the honoring of Doctors William C. Gorgas, Henry D. Holton, Frederick Montizambert, George M. Sternberg and Stephen Smith, by their election to honorary membership in the Association. The Association voted to hold its 1916 meetings in Cincinnati. Certainly not the least important feature of the meetings was the splendid and earnest spirit of the men and women assembled. One could not help but notice the strength and unity of purpose of all these people and it made one feel very safe with regard to the continuance of the great work of life conservation in our countries.

As a significant sign of the times we might well refer to the address of Governor Whitman of New York State. It represented the attitude of a broad-minded state executive toward the public health movement of today.

Governor Whitman pointed out that "public health is only one of many fields of public work which are growing and expanding year by year, and demanding constantly larger appropriations which they are able to justify by valid evidence of excellent results attained. Meanwhile, city and state debts and tax rates are mounting to an unprecedented degree." Yet he concluded that "public health is one of the social activities of the state whose development should be curtailed only in the very last necessity." After a keen and incisive review of the more important phases of the public health campaign—in relation to infant mortality, communicable diseases, tuberculosis and the diseases of later life—Governor Whitman points out as a justification of public health work, even on economic grounds, that the reduction in the New York state death-rate of .4 per 1,000 in 1914, as compared to 1913, corresponds to a saving of 4,000 lives which, taking the ordinary estimate of $5,000 for the average value of a human life, "means an economic saving of $20,000,000 due to progressive health work in a single year."

Most inspiring of all is the Governor's attitude toward the integrity of the public health service and its freedom from political control.

Finally, those who have watched the admirable results of the system of state health organization through a corps of district sanitary supervisors in force for two years in New York state will welcome the Governor's cordial approval of the plan as "most important and beneficial to the local communities." He adds, "I sincerely hope that some means may be found by which the services of these physicians may be retained, and feel confident that next year, when the members of the legislature are made fully acquainted with the facts as to the value of these services, funds will be provided for their continuance. I shall use my influence to attain this end, for, while rigid economy in the administration of the finances of the state is essential, savings in expenditure attained through decreased efficiency in health work are not only unwise but resolve themselves, in the end, into irreparable waste of the most valuable resources of the Commonwealth."

THE STANDARDIZATION OF PUBLIC HEALTH WORK.

W. S. RANKIN,
Secretary, North Carolina State Board of Health.

Read before the Public Health Officials Section of the American Public Health Association, Jacksonville, Fla., December 3, 1914.

THE PRINCIPLE OF STANDARDIZATION.

STANDARDIZATION is the establishment of relative values. The principle is as old as the Phœnician civilization, its birth dating back beyond Rome and Greece to the introduction of weights and measures. It is one of those fundamental principles of civilization the suspension of which would cause chaos to take the place of civilized intercourse and understanding.

STANDARDIZATION APPLIED TO PUBLIC HEALTH WORK.

It has for its end the establishment of means by which the public may ascertain the relative efficiency of health officers. For behold, there are good and bad health officers, just as there are good and bad men, good and bad doctors, good and bad angels. The people who employ the health officers—both kinds—should have some way of differentiating between the genuine and counterfeit. A standard should be created, if such is possible. Those who have the political right to select and dismiss health officials should also be given an intelligent right so to do. I believe public health work can be standardized.

CONDITIONS FOR STANDARDIZATION.

The first condition is a considerable degree of similarity in the several health jurisdictions to which it is desired that the standard should apply. In our search for similarity of conditions, we would naturally go from the larger and more complex governmental units to the smaller and simpler units. Similarity of conditions is less between countries than between states and provinces, and less between states and provinces than between counties of the same state or province; hence we find that the counties offer a greater degree of similarity of conditions than other governmental units and, therefore, are, so far as the first condition is concerned, the best fields in which to attempt a standardization of health work.

The second condition is some central agency influential, financially or governmentally, with the health jurisdictions in which standardization is to be attempted. Between countries there is no such central agency. Between the different states we do have a central agency, the federal government. But any attempt on the part of the federal government to standardize state health work would encounter the principle of state sovereignty and politics. Nevertheless the work of the American Medical Association under Dr. Charles V. Chapin and the work of the United States Public Health Service under Surgeon Fox, directed ultimately toward standardization with the state as the unit, is to be

highly commended. When we come to the county we find the second condition, as we found the first condition for standardization, most favorable. Between the counties we do find in the state government a central influential agency. The state and county governments are intimately related; the county politically and governmentally is a constitutional unit of the state and in the state legislature the county and the state have a common representative. We see, then, that the county in supplying our second condition is the best field for the standardization of health work.

The third condition is either an absence or an immature and very youthful health department in the health jurisdiction in which it is desired to bring about standardization. This third condition is not found in countries or states, for practically all countries and states by this time have health departments with fairly fixed and definite ideas as to plan and method. "You can't teach an old dog new tricks" is more or less axiomatic so far as any attempt at standardization with reference to countries and states is concerned. On the other hand, when we come to the county, we find either no health department or an immature health department. This baby health department is pliable and docile and susceptible to the influence of the mother state. To it the axiom "Train up a child in the way he should go; and when he is old he will not depart from it" will apply. We see, then, that the county supplies the third condition for standardization of health work in a degree that no other governmental unit or health jurisdiction supplies this condition.

We have purposely omitted the consideration of the municipality as a possible field for standardization. The municipalities fall short of the counties in all three conditions for standardization. The municipalities lack the proper degree of similarity. They vary in size, climate, and race. The municipalities lack intimate relation to some central correlating influence. The county is a primary and constitutional unit of the state government, whereas the municipality is a secondary and supplementary unit of the state government. Most municipalities have already some kind of a health department which it would be necessary to tear down before a new one could be established.

Conclusion: In any attempt at standardization of health work the county is the field of election.

THE ESSENTIALS OF STANDARDIZATION.

The first essential is a health official of fixed, established efficiency, that is, a standard health officer. There is a prevalent error, especially pronounced and dangerous to controvert in medical assemblages, to the effect that the average physician will make on his appointment or election to a health office an efficient health officer. There is just as much sense in claiming that the average physician is a dermatologist, a pathologist, an ophthalmologist, a surgeon, or any other specialist as that the average physician is a health officer whenever an undiscriminating public puts him where a health officer is supposed to be. *The efficient health*

officer is a specialist—as much a specialist as is the surgeon or ophthalmologist.

Now, the *sine qua non* of a specialist is not information, but practice; not knowledge, but skill. And where does the specialist acquire practice and skill? With the exception of the laboratory worker, he gets these essentials in a well-ordered hospital. And now to the quick: What in public medicine is the analogue of the well-ordered hospital in private medicine? The well-ordered health department. As in the hospital, the application of remedies to the sick cellular organism is practised, so in the health department is the application of remedies to the sick social organism practised. If I am right in my fundamental contention that the efficient health officer is a specialist, then the road to specialization in health work lies through an apprenticeship in a well-ordered health department.

Extended academic and laboratory courses and degrees will help, but will not make an ophthalmologist a surgeon or a health officer. The work of several of our best universities in giving special courses and degrees in public health is a commendable public service; nevertheless, the *great* need of public health work today is not additional academic training of medical graduates, but the practical training of medical graduates through apprenticeships in our best health departments, federal, state and municipal, preparatory to the vocations of health officers.

I believe the time is ripe for a committee representing this Association to confer with the Council on Medical Education of the American Medical Association for the purpose of interesting the Council in the selection and utilization of the efficient boards of health of the country for the practical training of medical graduates for the field of public medicine, just as the Council is now utilizing the efficient hospitals of the country for training medical graduates for private medicine. Without entering into details, I may say that a plan of mutual advantage to apprentice and department seems feasible. Such a plan might include the idea of training in several health departments, each of which had gained a reputation of proficiency in some special work, just as a physician might attend different clinics for their special advantages.

Whether such a plan of practical training for health officers becomes general or not, the North Carolina State Board of Health has included, in its legislative program for the coming year, provision for the practical training of from three to five medical graduates each year for positions of whole time county health officers. To illustrate the principle of practical training, I will give briefly our tentative plan. To the five or six counties that will decide during 1915 to employ full time county health officers, the State Board of Health will give the advice not to employ inexperienced men; the Board will advise delay in starting the work until a trained man can be had; the Board will disclaim any responsibility for the outcome of the work if its advice is not followed; and the Board will further tender its service in finding a man agreeable to the county and in giving this man from

six to eight months practical training. This will consist of a six or seven months' course apportioned about as follows:

(a) State Health Administration or State Health Laws and Policies, four weeks. During this course the apprentice is assistant to the executive officer of the Board, answers as much of the official mail as he can, and is referred to and quizzed upon the proper literature.

(b) Vital Statistics, four weeks. During this time the apprentice is given actual experience in every phase of the work of the Bureau of Vital Statistics, is referred to proper references on Vital Statistics and is required to study and criticize the vital statistics table appearing in various reports.

(c) Popular Sanitary Education, three weeks. During this course the apprentice is required to prepare articles for the Bulletin and press service, to study exhibits, slides and lanterns, and to act as assistant to the Bureau Chief.

(d) Tuberculosis, four weeks. During this time the apprentice assists in the State Sanitorium and in the Bureau for Tuberculosis and is assigned the proper reading and is given quizzes upon it.

(e) Laboratory, four weeks. During this time the apprentice will do the routine examinations of the State Laboratory and be quizzed on the interpretation of water analysis and upon epidemiological procedure.

(f) County Health Work, six weeks. During this time the apprentice will serve as assistant to an efficient county health officer and will be sent to see special phases of county health work in different counties.

On the completion of this six or seven months' practical course, a certificate of proficiency in public health work signed by the president and executive staff of the Board will be given the apprentice.

Now to return to our text. We believe that such a man, a man of fixed, established value, in short, a standard health officer, is the first essential in the standardization of health work.

The second essential in the standardization of health work is the ability to secure comparative results from two or more workers who have practically identical health problems. This, as we have already indicated, is possible through the systematic development of county health work and is made feasible through the employment of standard health officers. A conference of several whole-time county health officers, leading to the adoption of a standard plan of county health and with a standard form of monthly report, would permit of the monthly publication in the Bulletin of the Board of Health and in the state and county papers of the comparative results obtained by the different men in the different counties. The publication in untechnical language and form of comparative results of the several whole-time county health officers at work is absolutely essential to standardization.

THE RESULTS OF STANDARDIZATION.

Standardization will establish the relative value of health officers. Stand-

ardization will place health work on a basis of merit and will move it away from the avaricious grasp of the politician, whose palm is already beginning to itch. Standardization will create a strong demand for health officers and bring about competition on the part of numerous counties that will be interested in securing the most efficient men available. Standardization, through the competition that it engenders, will result in adequate remuneration for health officers, county and state, for the state will have to pay for health work in proportion to what the counties are willing to pay. Standardization, through the adequate remuneration of health officers, will make a strong appeal to the medical and engineering professions and result in a higher average type of health officer than we have at present. Standardization will guard the public against *pseudo* health work and give the public an easy means for knowing just what it is obtaining for its money. Standardization is of mutual advantage to both parties to the contract, to employee and employer, to the health officer and to the public.

Discussion.

DR. C. J. HASTINGS (*Toronto*): I feel that we are very much indebted to Doctor Rankin for having presented this matter, because if there is anything we lack more than another, it is standardization and uniformity of action. It reminds me of an occurrence nearly a quarter of a century ago when I graduated in medicine. I asked one of my most practical Professors—I was intending crossing the Atlantic to take a post-graduate course—what degree he would recommend me to take over there. He replied "Spend your time in the hospital over there getting all the practical work you possibly can. The degrees are very excellent in themselves, but after all I think that the most valuable asset that a public health officer can have in the administration of his duties is an ample equipment of good common horse sense."

DR. J. F. FERRELL (*Washington, D. C.*): Dr. Rankin has discussed a subject which I believe is coming to be regarded as one of the most important that is confronting the health agencies of states and cities throughout the country. I think that it is absolutely necessary that there be some plan by which those men who contemplate going into health work will have an opportunity of getting the practical experience in a way similar to the practical experience that is given the medical man in his hospital training. The plan that Doctor Rankin has outlined, it seems to me, is most excellent for those men who have just finished their medical training and are anxious to enter the field of preventive medicine. In the beginning, in any field, most men expect to receive a moderate compensation, and they in all instances will not feel able to go to some of the colleges and take the long courses. Many of them are going to hold subordinate positions where the salaries will not justify them in taking these long courses. In cases of this kind it seems to me that it is necessary for the state health departments, some of the larger municipal health departments, together, perhaps with the state universities, to get together and provide short courses for the training of these men. There are going to be, however, a number of men needed for the more important health positions throughout the country, and it is going to be necessary to continue to have the long courses that we have, and it ought to be made possible for those men who have served these apprenticeships, who have entered the field of public health and have shown special aptitude and special promise to fill bigger positions, to go to these long-course colleges and there equip themselves for larger positions. It seems to me that in addition to what Doctor Rankin has suggested, it might be feasible to have some plan by which scholarships could be awarded to men who offered special promise so that they

could go to these large institutions, take the two years' course and get the practical training both in the large cities and the state departments of health where the work is most efficiently done. Then there should be some means by which these men, after taking this training, could have some assurance that they were going to have an opportunity to carry on the work for which they had prepared themselves. There ought to be some means by which men who take this special and post-graduate training could be made secure in the positions for which they have trained themselves, and it might be possible for some agencies to come together and assist in this direction; and increase the efficiency and practicability, if such be needed, of some of the large institutions for training of health officers and lend real assistance by enabling those men who are working on small salaries, who have shown special ability in health work, to go and take these courses at a minimum of expense. I think that it is not unlikely that provision will be made before a great while for the awarding of scholarships of this kind.

DR. MCCAMPBELL (*Columbus, Ohio*): It occurred to me that the section and the health officers here might be interested in an experiment we have been trying in Ohio. It so happens that the secretary and executive officer of the Ohio State Board of Health is professor of preventive medicine in the Medical Department of the Ohio State University, and we have a rather close affiliation with that, and a plan is on foot to establish a post-graduate medical course for health officers. But until that time is reached it seemed desirable to so something else along the line of educating young men in the field of preventive medicine, so during the last two years we have tried the following experiment: Junior medical students were taken two hours a week throughout the year and various sundry parts of the field of preventive medicine discussed with them and laboratory work provided for them; I mean field laboratory work; for example, the studying of the most modern and up-to-date methods of water purification, sewage treatment, refuse disposal, etc., also laboratory work in diagnosis and control of communicable diseases, especially those diseases belonging to acute exanthema, such as smallpox, scarlet fever, and the like. These same students in the senior year have been given this same work two hours a week. The plan is that when the boys graduate, some 50 of them, that about 40 of them will be placed in the state of Ohio as municipal health officers, if the proposed bill now pending is passed by the legislature. I think the experiment will be watched with considerable interest, that is bringing a medical man out with a rather complete knowledge of the field of public health work, vital statistics, public health law and communicable disease and the engineering end; and the result of this will be very satisfactory. We all appreciate, as was pointed out by Doctor Rankin, that the average physician knows little or nothing about the field of preventive medicine, and if we can bring out a new crop of young men who are interested in this line of work, it strikes me we are accomplishing a great deal.

A MEMBER: May I ask the gentleman from Ohio a question? What is the plan of district health officers? Is your state divided into districts and is there a health officer in every district?

DR. MCCAMPBELL: Inasmuch as the constitution of the state of Ohio prohibits appointing officers in the counties and consequently provides for all county officers being elective and we want to avoid that, and inasmuch as that situation exists, the plan is to combine counties together, based on population and of course geographical distribution also, and place at the head of that district a health officer who is under state civil service. The appointment of that health officer is made by the joint board of county commissioners of those counties on certification of the State Civil Service Commission and with the approval of the State Department of Health and the bill provides also that that district health officer shall work under the supervision of the State Department of Health. The reason we put the appointing power in the hands of the joint board of county commissioners is because we have a home rule provision in the constitution of Ohio and people when they pay out their own money like to have something to say about who is doing the work. They make the provision, however, about the district health officer being a resident of the district. Then we provide for sub-district health officers appointed under civil service the same way and controlled

by the district health officer. It will make instead of 2,200 health officers in the state of Ohio, approximately between 250 and 300, taking into consideration not the big districts but the smaller districts, about 15 district health officers with the remaining sub-district health officers devoting part time to the work, presumably men who were able to pass the civil service examination.

DR. FRONCZAK (*Buffalo*): I have noticed that many of the young men after graduating do not even know how to write out a proper birth or death certificate, so we are delivering lectures before the University and every student of the medical department must go to the department of health and study every kind of work done by the health department. In other words we keep them in every one of the nine bureaus in the 27 divisions of the department of health, so that when a man goes through the department and an examination is conducted, he really knows something about preventative medicine, the university coöperating with us in every way possible, and the state also, and I believe that in this way we are preparing a very nice group of young men who will know something about preventative medicine when they graduate.

DR. CHAS J. HASTINGS (*Toronto*): I would like to make myself perfectly clear in regard to the absolute necessity of a special training for health officers. I was a little afraid I might be misunderstood on account of the emphasis I was placing on the practical knowledge that was necessary. For a man to want to take public health administration without a thorough knowledge and preparation of epidemiology and the value of the vital statistics and public health matters generally, I think would only meet with one result. However, I think it is extremely important for the highest degree of efficiency in public health administration, that every so-called health inspector—I think it is time that we are doing away with the term "health inspector" or "sanitary inspector"—we want health *instructors* and sanitary *instructors*; every one in connection with the department of health should have a thorough training and in order to try it and bring that about we have, in connection with the Department of Health in Toronto, established an institute of sanitary instruction. We have now affiliated with the Royal Sanitary Institute. We give a course of instruction there and require every employee of the department to take that course of instruction and to pass the same examination set by the Royal Sanitary Institute in England. I think we can hope to make very much more headway when we raise the general standard of every person in connection with the department. As Carnegie said many years ago, "It is not the man who can do the work but the man who can get the men around him that can do the work." And I think it is only the man that knows what work can be done and how it ought to be done that can get men for the accomplishing of that work.

THE INCUBATION TIME IN THE CULTURE DIAGNOSIS OF DIPHTHERIA.

ADOLPH GEHRMANN, M. D., *Chicago, Illinois, Professor of Hygiene, College of Medicine, University of Illinois; Bacteriologist, Columbus Medical Laboratory.*

Read before the Laboratory Section of the American Public Health Association, Jacksonville, Fla., December 4, 1914.

EVEN after years of experience it happens that practising physicians sometimes lose much of the value of rapid diagnosis by the use of throat cultures from their suspected diphtheria cases, because they do not understand the principles that are involved. Public health and other laboratories can greatly improve the efficiency of this diagnostic method by instructing physicians as to the reasons why the test is conducted in a certain way. What I wish to bring to your attention here is the advantage of immediate incubation over the usual way of handling cultures. By sending or carrying them to the laboratory, and then putting them into the incubator, just this length of time is lost in each case. I find some of my patrons fail to get a good result because they allow the cultures to get cold or even frozen in the winter season, and then bring them in, expecting to get returns from the culture within a few hours. When the swabs and not the cultures reach the laboratory a few hours after being made, or as late as the day following, much time is also lost if the direct examination is uncertain. It is often difficult to make the practitioner understand that it is not merely the act of making a throat culture that gives him a certain result. One pharmacist who received cultures to be transmitted to the laboratory would not have them in his store because of personal fear, so he tied them to the awning outside, and let them hang until they were taken down by a messenger.

Among the various factors interfering with the best results in throat culture diagnosis are the partial spreading of the material on the culture-medium, the delay in getting the cultures into the incubator, and not examining the same microscopically sufficiently early. When I first started the diphtheria diagnosis at the Chicago Health Department, we tried various ways to bring the incubation near to the patient. Small hand incubators were made, and carried about by the medical inspectors or school physicians. Later a thermos bottle scheme with warm oil was tried. These methods were found unhandy except where a considerable number of suspects were to be examined together. The general practitioner found much trouble in keeping his incubator in order, and usually came across the cases unexpectedly. Neither could he always reach the incubator in any reasonable time to make the scheme a success. Following this attempt to bring incubators to the patient, we came to use body incubation as a means to overcome the difficulty, and to make this possible developed the

outfit for diphtheria diagnosis that is presented herewith. Dr. W. K. Jaques, of the department staff, was the first to use the method in practice.

The method has since been used by my patrons at the Columbus Medical Laboratory, and makes it possible to report on practically all diphtheria cultures in five or six hours after being taken from the patient, and not this time after having been received at the laboratory. We often examine cultures when the messenger bringing the same arrives, and the report is taken back by him. Only throat cultures taken late in the afternoon have to go over until the next morning. The special features in my method are the employment of blood serum culture-boxes instead of glass tubes, as usually used, and in the incubation of these boxes by placing them next to the body under the clothing as soon as inoculated, where sufficient warmth enables incubation to proceed as satisfactorily as in any incubating oven. Cultures so placed in body incubation often have a visible growth when they reach the laboratory, and if this is not the case, we at once make a "Klatch" preparation, which will show the presence of a very small number of bacilli growing. The wide surface on the culture-box gives opportunity for making these early microscopic examinations an exact possibility. When cultures are sent a long distance, as over night by mail to state laboratories, it is much better to incubate the cultures first and then send them rather than to do this on arrival.

In diphtheria examinations it is found that a certain number of cases can be diagnosed directly from the swabs, or when a small piece of membrane is placed in the culture it can be fished out and a slide made, which will show the bacilli without the necessity of incubation. Such findings are reliable for a limited number of positive cases, but in the doubtful instances it is necessary to wait for the culture to grow, and the more certainly that the case is negative for diphtheria, just so much longer do we have to wait for a culture to develop completely. When the inoculation is made and the culture immediately incubated, even as short a time as two hours, it gets the growth started; in fact, the culture media should be warm before the mucus from the throat is placed upon it. In this way the bacilli never stop growing, but the active increase goes on directly from the throat to the culture medium. It is very satisfactory to start by body incubation, and later the cultures can be placed in the incubator in the laboratory, allowing time for the growth to come up before the slides are made.

In order to prove the relative efficiency of body incubation and the methods usually used, a number of observations from routine tests, as illustrated in the accompanying tables, were recorded. The plan used was to take actual cultures prepared from both diphtheria and non-specific cases, to incubate some at once, and to place others for various lengths of time under the conditions of temperature, as shown. These were then placed in the incubator and examined about every half hour until it was possible to determine that the bacteria present were

growing. In order to avoid some of the possibilities resulting from making slides from the same place several times, the mucus or specimen was spread out and rubbed into the medium very carefully, so as to get as even a distribution as possible. When the slides were made, the material was taken in a streak-like manner across the surface, or by a "Klatch," so that a new surface was examined each time. The time required for the growth to appear is from the time that incubation begins, and the time of exposure added to this shows the entire length of time intervening from the taking of the culture until it was possible to make an accurate diagnosis.

In our district we do not mail cultures, but send them by messenger. When they are mailed, as to State Board laboratories, there is much time lost. Special delivery does not help much because afternoon cultures have to wait until morning to be examined when delivered during the late night hours. It would be much better to incubate a culture during the evening and then send it to the laboratory than to send it at once and have it lie in the post office over night.

Below are examples of the gain in time that can be expected when immediate incubation of these cultures is practiced. Our experience has proven that the body heat may be used for incubation of throat cultures with perfect satisfaction. If it is not possible to reach an incubator at once, cultures should not be allowed to chill, as the growth is very much depressed. Cultures may be left with the patient, fastened under the clothing, and later one may return with a microscope and make the necessary slides.

Throat Culture.	Disposition.	Laboratory.	Examined.
9 a.m.	Body incubation.	12 m.	12.30+
9 a.m.	By messenger in overcoat pocket.	10.30	3—+
4 p.m.	Body incubation.	7 p.m.	7 p.m. Klatch positive.
4 p.m.	Sent by messenger.	7 p.m. No growth. Klatch negative.	Next morning positive.
9 p.m.	Body incubation.	8 a.m.	8 a.m.+
9 p.m.	By messenger in morning (same as mail).	8 a.m. No growth.	1 p.m.+
8 a.m.	Body incubation at once.	2 p.m.	2 p.m.+
8 a.m.	Laboratory incubation.	2 p.m.	7 p.m.+
8 a.m.	30°, one hour.	9 a.m.	4.30 p.m.+
8 a.m.	40°, one hour.	9 a.m.	4.00 p.m.+
8 a.m.	50°, one hour.	9 a.m.	4.00 p.m.+
8 a.m.	60°, one hour.	9 a.m.	3.00 p.m.+

+ = diagnosis determined positive.

Culture Made.	Disposition.	Arrived Laboratory.	Examined.
9 a.m.	Body incubation.	10 a.m.	12 n.—1 p.m. few cocci, 2 p.m. cocci, 3 p.m.+.
9 a.m.	One hour, messenger, in warm street-car.	10 a.m.	12 n.—1 p.m. 2 pus cocci, 3 cocci.
11 p.m.	Body incubation.	9 a.m.	9 a.m. diphtheria+.
11 p.m.	Office, 60°F.	9 a.m.	1 p.m. diphtheria+.
9 a.m.	Body incubation.	As stated.	4 p.m. staphylococci,+.
9 a.m.	Laboratory incubation.	As stated.	4 p.m. staphylococci,+.
9 a.m.	40°F., 2 hours.	11 a.m.	5 p.m. Klatch, uncertain.
9 a.m.	Body incubation.	As stated.	3 p.m. diphtheria +.
9 a.m.	Laboratory incubation.	As stated.	3 p.m. diphtheria +.
9 a.m.	40° to 50°, 3 hours, outdoors.	12 n., by messenger.	5 p.m., doubtful. Next morning, diphtheria+.
9 a.m.	Body incubation.	12 n.	2 p.m., Klatch, cocci+
9 a.m.	Frozen 2 hours.	11 a.m.	5 p.m., no growth. 8 p.m., Klatch, cocci +.

+ = growth positive.

AN APPARATUS FOR ACCURATELY FILLING DILUTION BLANKS.

R. Freas.
Of the Bacteriological Laboratory of the City Board of Health, Baltimore, Md.

IN LABORATORIES where many routine examinations of milk, water, oysters, etc., are made, the filling and sterilization of 9 cc. and 99 cc. dilution blanks present somewhat of a problem. In our food laboratory we formerly filled the French square bottles with water, then sterilized them. This method was unsatisfactory for the following reasons:

Irregular variations in volume due to the evaporation in the autoclave, thus sometimes causing considerable error.

The necessity of keeping a large number of sterilized blanks on hand, as the operation of filling, autoclaving and cooling required five hours and sometimes even longer.

An occasional dilution blank cracks in autoclaving, escapes attention, and is a possible source of contamination.

These difficulties have been overcome by the designing, testing and use of the apparatus shown herewith.

The burette is of simple construction and is automatic, connected on the right to a simple suction pump (operated by water pressure) and on the left to a two-gallon bottle of sterile water. The top outlet is for the purpose of breaking suction when the burette is filled and is provided with an air filter of cotton. The stopcocks, especially the lower one, are provided with a large hole to allow the water to drain rapidly. The least possible suction necessary to fill the burette is used and when the apparatus is not to be used for five minutes or more the

A, Cotton filter.
B, Stopcocks.
C, Connection to suction pump.
D, Connection to sterile water reservoir.
E, Point of constant level.
F, First, 9 cc. graduation.
G, Eleventh, 9 cc. graduation (0-11 -99 cc.).
H, Shield to prevent dust contamination.

pump is turned off. The burette, connected to the two-gallon bottle with a rubber tubing is sterilized in a large autoclave for thirty minutes at twenty pounds pressure.

We use two sets of filling apparatus sterilized alternately, each one used one or two days. Extra two-gallon bottles of distilled water are stoppered and sterilized each time. With each sterilization of water two dilution blanks, one inoculated with B. subtilis, and the other with Staphylococcus albus, are used as controls of the autoclaving. As a control of our dilution technique three large blanks and three small blanks are plated and three plain controls of agar are made with each day's work. The examination of these controls after forty-eight hours' incubation at 37° shows only one or two colonies on an occasional plate.

AN OUTBREAK OF COWPOX.

A. J. Douglas, M. D.,
Medical Health Officer, Winnipeg, Man.

Read before the Public Health Officials Section of the American Public Health Association, Jacksonville Fla., December 2, 1914.

IN THE month of October, 1913, the attention of the Winnipeg Health Department was drawn to what was described as an unusual condition among a number of cows recently purchased by a dairyman supplying raw milk to the city. An examination was made by the departmental veterinarian. This examination resulted in the affection being diagnosed as cowpox. This conclusion was confirmed a day or so after by an independent examination by two other veterinary surgeons. Investigation showed that the disease must have been in existence for some time and was in most instances in advanced stages. In some cows the lesions were pustular, while in others ulceration had set in, the latter probably due to manipulation of the teats during milking. The number of pustules or ulcers varied in each animal and even on each teat. In some only one or two were present, while others showed a dozen or more. Some had become confluent and formed ulcerated patches, particularly at the base of the teats, varying in size from an inch in diameter to more than twice that size. These patches were extremely sensitive to the touch.

The general condition of the animals did not appear abnormal, and milking, with the exception of being somewhat painful, could be carried on as usual. The quantity yielded was about what would be expected from healthy animals. Enquiry showed that all the affected animals had been recently procured from a dealer who had imported them from a distant place, at which it was afterwards found that the same condition had prevailed.

The affected cows were quarantined for a period of a month, at the end of

which the disease seemed to have run its course in those affected. No other cases since developed.

The disease throughout was of a mild type; the pustules, when not disturbed, exuded freely, after which a crust formed over the part, varying in size from a quarter to half an inch in diameter, of an irregularly ovoid shape. The crust then dried up and fell off, leaving a pitted ulcer which soon healed. In the cases where confluence had taken place the conditions were a little aggravated but yielded readily to treatment, which consisted of wiping the teat with a weak solution of carbolic acid and allowing this to dry on the part.

A verification of the diagnosis was obtained when it was discovered that the departmental veterinarian had in some way inoculated himself. The affection in his case ran through the various stages usually seen in a normal vaccination, only in a somewhat severe form. The first symptoms were a slight roughening and itching of the skin over the site of inoculation, followed by papulation, vesculation and pustulation which passed into ulceration with some destruction of tissue. The ulcer took some two months to heal and left a depressed scar about an inch in diameter. Considerable constitutional disturbance was in evidence and much pain and swelling locally. We were unable to ascertain the original source of infection but could find no evidence of human smallpox in the neighborhood from which the affected animals came.

Discussion.

Dr. E. C. Levy (*Richmond, Va.*): I would like to ask Doctor Douglas whether he believes that cowpox is identical with vaccinia.

A great many of the manufacturers have expressed the view that the cows from which Jenner obtained his virus were cows that have been accidentally inoculated with human smallpox, and they have further expressed the view that true cowpox will not protect against human smallpox.

Doctor Douglas: I am afraid I cannot throw any light on that. I endeavored to find out if smallpox had been prevalent in the districts from which these cows came, but could get no history whatever.

Doctor Levy: Did you try to inoculate any vaccinated individual with this?

Doctor Douglas: I did not attempt to go any further. When I get back to Winnipeg, I will inoculate our veterinarian with vaccine and see what will happen.

RURAL SANITATION AND HOOKWORM DISEASE.

DR. A. G. FORT,
Georgia State Board of Health.

Read before the Public Health Officials Section of the American Public Health Association, Jacksonville, Fla., December 1, 1914.

THE above-named subject has been presented to this Association, in one phase or another, at each meeting for a number of years. The revelation made by investigations conducted by the Rockefeller Sanitary Commission throughout the State Boards of Health, have impressed us with its general prevalence throughout the southern states and other investigations show the same is true throughout the tropical and sub-tropical countries. The campaign conducted in Porto Rico more than demonstrated the value to a people in its eradication. Therefore, realizing this disease as the greatest one public health factor, from 36 degrees north of the equator, to 30 degrees south of same, I make no apology for presenting this same subject, or rather one phase of it, for your consideration today. Many investigators have presented the result of their studies of the parasite causing the disease and have demonstrated the method of infection and the pathological conditions produced by the presence of it in the human anatomy, and primarily, one phase of its eradication—prevention. I wish to present to you on this occasion, another phase of its eradication and prevention—treatment. This has been referred to in many articles, but no special preliminary treatment or anthelmentic adopted.

In the treatment of hookworm disease, thymol has been and is now the drug in most general use in the United States. This is given in from $7\frac{1}{2}$ to 60 grain doses, after preliminary treatment, which varies according to the age, physical condition and surroundings of the patient. Finely powdered thymol in capsules is the method usually employed. Some prefer to give thymol in the evenings, others prefer to give the drug early in the morning. In the cases which I treated personally, prior to 1910, I used calomel in the afternoon, epsom salts in the evening, and at 5 a. m. the next day gave one half the dose of thymol and at 7 a. m. the remaining half of the dose and at 9 or 10, a dose of magnesium sulphate. This method of treatment was fairly satisfactory, although calomel often times nauseated the patient and occasionally the thymol caused depressing effects. I had no fatalities in my personal work. During the first eighteen months of dispensary work in connection with the State Board of Health of Georgia and the Rockefeller Sanitary Commission, we gave more than 10,000 treatments, using thymol, and unfortunately had three fatalities, but our treatment differed from that which I used in that we gave no calomel on the day preceding the administration of the anthelmentic. The news of a fatality spreads much more rapidly than does the news

of the great benefit to the thousands treated with no untoward effects from the drug. While the fault in two of these fatalities was readily traced to them, nevertheless, the fear of treatment spread in that section and hindered us greatly in our work. My attention was called to the use of betanapthol in the treatment of hookworm through "The Report on Anemia in Porto Rico" in which it quotes Bentley as follows: "By this treatment, I have been able to expel in a number of cases from 500 to 1,000 worms," so in my private practice I had thoroughly tried out this remedy in more than 200 cases and had found it, from clinical reports, as efficacious as thymol. Not only is the drug as efficacious but the poisonous effects are lacking. So we changed in our dispensary campaign from thymol to betanapthol. Dock & Bass on Hookworm Disease, page 223, gives the following table, comparing the value of the two mentioned drugs:

PER CENT OF TOTAL NUMBER OF WORMS EXPELLED.

After 1 dose of thymol	76.85
After 1 dose of betanapthol	72.24
After 2 doses of thymol	90.17
After 2 doses of betanapthol	88.12
After 3 doses of thymol	95.28
After 3 doses of betanapthol	93.67
After 4 doses of thymol	96.57
After 4 doses of betanapthol	96.47

We knew that the relative efficiency of these two drugs, given as they recommended, was practically the same. These gentlemen administered their betanapthol in one half the quantity as their thymol, but in our work we have administered betanapthol in the same quantity as we did thymol—from 7½ to 60 grains. While we have no definite figures, it is natural to suppose that if the above table holds true, in giving one-half dose betanapthol, it would be slightly changed in favor of betanapthol in giving an equal quantity. The preliminary treatment followed is identically the same as that given for thymol and the precautions as to the use of alcohol, oils and fats are the same. We have found that there is less complaint of nausea, vomiting and dizziness on the part of the patient when this treatment is used than when thymol is used, and a larger per cent. return for their second, third and fourth treatments than returned when thymol was used. This line of treatment has been used more than 50,000 times, and while we have had a few suffering a slight amount of depression, we have as yet had no fatalities. Taking these things into consideration, we believe betanapthol preferable to thymol.

Oil of eucalyptus has been mentioned, but its relative value is lacking as compared to the two drugs mentioned.

I have never used male fern in treatment of hookworm, but have in many instances used it for hymenolepus nana and other tapes. One who has ever administered thymol or betanapthol and male fern, will utilize either of the first two in preference to the last.

During the summer of 1913, my attention was called by Doctor Dorsey of the city of Atlanta to the following extract found in the *Journal of the*

American Medical Association, page 706, March, 1913: "Oil of Chenopodium in Hookworm Disease—Schuffner and Vervoort state that in their practice in Deli in the last 15 years, they have found uncinariasis extraordinarily prevalent. In the last 8 months they have been giving oil of chenopodium a thorough trial in 1,457 cases, comparing the efficacy with that of thymol, napthol and other vermifuges. Compared with eucalyptus oil with a co-efficient of 38, napthol with 68 and thymol with 83, oil of chenopodium surpassed them all with 91. Another great advantage is that it expels ascarides with the hookworms, thus impressing the minds of the patients much more than when the insignificant hookworms alone are expelled. It is also comparatively pleasant to take." The therapeutics of oil of chenopodium was then investigated, and I found that it had been used with success through a long period of time for ascarides and that it is considered practically free from dangerous effects, and as ascarides quite frequently occur in connection with hookworm infection, we decided to try it in a few selected cases. Doctor Dorsey also called my attention to the fact that neutral mineral oil is not absorbed in the alimentary tract, and suggested that if oil of chenopodium was given with neutral mineral oil we would reach a larger number of parasites than by giving the chenopodium undiluted. We gave it a trial, and in February of this year I received a report which was not complete but led me to believe that this drug was worthy of further consideration. This report was from Doctor Wood and read as follows:

——— Ga., Feb. 23, 1914.

"With reference to my investigations with oil of chenopodium in the treatment of hookworm disease, I wish to first state that the conditions under which these cases were treated were by no means ideal and clinical, for the physiological effects upon the patients could not be noted personally, information being secured through attendants upon the cases or the patients themselves. My report is therefore of necessity far from perfect and only preliminary. At the ———, I found 51 cases. The first half or 25 of these were given 30m. wormseed, with an ounce of liquid alboline in two doses.

"Eat no breakfast; at 5 a. m. take half the medicine; at 6 a. m. take other half of the medicine; at 7 a. m. take dose salts.

"The . . . reported that a few of these were somewhat nauseated and weakened. Nineteen were reëxamined 2 weeks later, 16 negative and 3 positive. The other 26 were then treated with betanapthol in the usual doses and salts the afternoon before.

"Eat no supper; eat no breakfast; take half the medicine at 5 a. m.; take the other half at 7 a. m; take dose salts at 9 a. m."

Upon inquiry, I was informed the last treatment made more of them sick than the first, not nauseated, but weak and dizzy. Eighteen of these were examined later with only 9 negative and 9 positive. But few parasites were secured from either set, as specimens contained much débris and were poorly cared for. All were given oil of chenopodium the second treatment and nausea was reported in several

small boys. At the . . . I treated about 20 cases, some with betanapthol, the others with chenopodium. As much as 50 or 60 min. were given in castor oil with marked depression, nausea and some vomiting. Large doses with alboline were tried, which still produced some vomiting and a feeling of intoxication, then depression. More worms were secured from the wormseed cases than from the betanapthol cases. Some took both treatments. All of them much preferred the wormseed. The doctor in charge of these patients stated that when small doses were given the latter was far more pleasant to the patient and more effective as a vermifuge.

With other cases various methods were tried. Some had alboline, some castor oil, some olive oil and some no oil with the chenopodium. All cases treated with castor oil were nauseated and depressed. Some taking olive oil were nauseated, and some were not sick. Only a few taking alboline experienced depression or nausea. Those taking no oil were not sick but treatment apparently not effective. About 10 cases whose fourth and fifth treatment was chenopodium reported more parasites than with any other former treatment. It seems, therefore, that 15 to 20 min. doses in alboline is the best method of administration, and is preferable to betanapthol or thymol because it is safe and effective.

Further report in June 1914 from Doctor Wood shows oil of chenopodium to produce practically no ill effects. Later, we received the following report from still another county in Georgia:

Report on Oil of Wormseed.

	Treatment	Reëxamined	Cured
First	146	72	18 or 25 %
Second	54	40	10 or 25 %
Third	31	10	8 or 80 %

Since studying the use of this drug, I find that it is used in Sumatra for hookworm disease. Dr. Wickliffe Rose of the International Health Commission writes that the following prescription is used by the physicians in that country.

1. Drug used, oil of chenopodium.
2. Milk diet for one day.
3. Min. 7 at 6 a. m. (oil of chenopodium).
4. Min. 7 at 7 a. m.
5. Min. 7 at 8 a. m.
6. Castor oil at 11 a.m.

Doctor Guthrie of the Johns Hopkins Hospital calls attention to a case which was reported briefly by Doctor Levy, a member of the hospital staff, of a patient who had hookworm infection which was resistant to thymol but which yielded readily to chenopodium. He states that during the past summer, while in Central America, he had opportunity to test the efficacy of the drug. He encountered both the Old and the New World type. The method of administration was as follows:

First day—5 p. m., Epsom salts, oz. 1; liquid diet begun.

Second day—5 p. m., Epsom salts, oz. 1; liquid diet

Third day—6 a. m., oil of chenopodium, min. XVI in capsule; 8 a. m., oil of chenopodium, min. XVI in capsule; 10 a. m., oil of chenopodium, min. XVI in capsule; 12 a. m. castor oil, oz.

1, plus chloroform, min. XLV; nothing to eat third day until treatment is completed.

He gives his conclusions as follows:

1. The treatment was well borne; no ill effects were noted and no complaints of subjective discomfort were elicited on careful questioning.

2. The treatment was successful in both the Old and New World infections. It sometimes had to be repeated, but it practically never failed to eliminate some worms or to reduce the number of eggs in the stool.

3. It succeeded in cases in which thymol had been tried, sometimes repeatedly, and had failed.

4. When given in parallel series to patients as they came, the chenopodium seemed much more efficient than thymol.

5. The drug is also very efficient for ascaris, somewhat less so for whipworm, and often clears the stool of Strongloides intestinalis, but I do not believe that in such instances a permanent eradication has been effected.

Inasmuch as the supply of thymol and betanapthol is now very limited, and the price of both drugs quite high, and also in view of the fact that the report from many show that this drug is efficacious, and practically non-toxic, I consider it well worthy of your consideration in connection with the treatment of hookworm disease. That it is slightly toxic is shown by the following "Hookworm Disease, Use of Chenopodium," by Murrah Galt Motter. "Toxicologically, a search of the Index Catalogue and the Index Medicus revealed but 12 published cases of poisoning by wormseed oil in something over 50 years, the first having been published in 1852 and the last in 1903. Of these cases 8 were fatal. The report of one of the fatal cases is cited by Wood, with the added comment: 'It is plain that the wormseed was not the direct immediate cause of all these symptoms or of the fatal result.' All of the reported cases, however, show a certain general similarity, indicating that the toxic action is exerted particularly upon the central nervous system. Salant, in a preliminary report of his studies on the pharmacology of this oil, notes the possibility of cumulative action, indicated by the fact that non-toxic doses, when repeated in a day or two, were fatal in the rabbit. In the reported cases of poisoning the dose appears to have been excessive, and in some cases, repeated. Bruning asserts that when properly used this remedy does not cause any unpleasant secondary actions, an experience confirmed by that of subsequent workers."

Dr. Chas. Waddell Stiles has called my attention to the fact that he finds reference to a fatal case in a child 3 years old in a dose of ½ dram of chenopodium. Wilcox in his Materia Medica & Therapeutics refers possibly to the same case.

This discussion of the treatment of hookworm is presented to you from the standpoint of a man on the firing line in the campaign leading to the eradication of this malady. We have in a few of our cases used gelatin capsules, and to our sorrow, as we find, as reported to me by Doctor Holton of Grady Hospital, who has given two treatments, using gelatin-coated capsules, that these

capsules passed through the alimentary tract intact. We believe that in this drug we are made independent of chemical products from other countries, and are looking forward to the time when, in the heavily infected areas of our state, instead of giving spring tonics in the form of some proprietary or patent medicine, the good mothers will find it more beneficial and equally as safe to give a decoction or infusion of the "Old Jerusalem Oak," an ever-present plant in all rural sections of the United States.

A STANDARD CERTIFICATE OF BIRTH.

W. A. Plecker, M. D.,
State Registrar of Vital Statistics, Richmond, Va.

Read before the Vital Statistics Section, American Public Health Association, Jacksonville, Fla., December 1, 1914.

SATISFACTORY blanks constitute an important element in securing prompt reports of births and deaths and full replies to all inquiries. In the beginning of the work of the Virginia Bureau of Vital Statistics, for lack of both time and experience, we adopted various forms in use by other states, feeling assured, at the time, that they were not perfect.

We began immediately, as experience dictated, to study carefully every form in use by us, and to keep notes of such changes as suggested themselves, for use in preparing the second lot. In one or two instances only have no material changes been made with the second order.

The essential points which we have kept before us have been:

Simplicity in wording, considering in all cases the lowest, rather than the highest educational attainment of those who are to make use of them.

Attractiveness and convenience in arrangement, spacing, and print.

Durability in the permanent birth and death blanks, with lightness of weight as far as consistent with conveniences of use. This latter point is a matter of importance when the postage on tons of supplies going and coming is considered. This end has been secured by the use of light paper, and by reduction in size, in some cases.

A new feature, since the extension of the parcel post privileges to printed matter, is the binding or at least padding of blanks, to secure their acceptance at book rates. The birth and death blanks overshadow all others in importance. They are permanent and must be on good quality of bond paper. They are to be mailed in large numbers and must be of light weight.

A more potent reason, however, for the use of thin paper is the question of shelf space which the certificates must permanently occupy when bound and filed, at an ever increasing rate. In the questions of size and general style and appearance, the present accepted standard death and birth certificates scarcely admit of improvement, when the amount of necessary printing and writing upon them are considered.

As to the actual information sought, we believe there is but little room for advantageous change. The only improvement we are able to offer in the death blank, is as to the numbering spaces, which will be brought out in the consideration of the birth certificate.

My experience of some years, as county health officer and registrar of vital statistics, where I was in direct contact with midwives and physicians, together with the added experience as state registrar, convinces me that the present birth certificate will admit of many improvements, as I wish to show in detail, and to demonstrate by comparison of our present Virginia form with that in general use, as recommended by this body (The American

Public Health Association) and the United States Bureau of the Census.

In size, general appearance and actual information sought for, no change is proposed. The apparently slight changes recommended, however, experience shows to be of immense importance in securing complete and correct information from our eight thousand ignorant midwives, most of them negroes, absolutely devoid of education and power of reasoning.

1. The first improvement, which we do not claim as our suggestion, is in the numbering of the questions. This is of great importance when attention is to be called by individual correspondence or in a general way to particular points. At present, we are emphasizing through circular letters and print, the importance of correctly answering questions six and nine, which relate to legitimacy and the mailing address of the parents.

2. To protect our own space for file numbers from local registrars, we have clearly indicated by boxing the space and by direct admonition, that it is for "State Registrar only." At the same time, we point out to them by an underline, the space that is reserved for their serial registered numbers. This arrangement, at the same time, throws the heading of the certificate to the center, thus giving the top of the blank a more balanced appearance.

3. We have discarded one of the Registration District No. spaces, intended for use when the registrar has two registration districts. We found that no feature of our first form, which we adopted from other states, was more generally misunderstood, or called for more patient explanation to literally hundreds of local registrars, than those perplexing spaces.

4. In question 1, as to place, we simply changed the word "Township" to our term "District," and substituted "Incorporated town of" for "Village of," to suit our needs. Those flexible changes, of course, can be made as required. An underline note, requesting the name of hospital or institution, rather than the street and number, brings more accurate information as to the place of birth.

5. The need for the term "Boy or Girl," instead of "Sex," was made apparent to me when remonstrating with a colored midwife for always omitting the answer to that essential question. When I discovered that she did not know the meaning of the word *sex*, I endeavored to make it plain by telling her that we wished to know whether the child was male or female. Her puzzled look still proved that my language was not sufficiently simple. I then asked, in reference to the certificate in hand, "Was the child a boy or a girl?" The question brought a ready response, and that became the accepted form for the question as to sex.

6. Questions 4 and 5, of this old form, have been the greatest stumbling block for midwives, physicians and local registrars, seeming to be equally puzzling to all classes. Many of our old certificates contain the word "Other," in answer to question 4, to inform us that the child was neither twin, triplet nor yet quadruplet. We, therefore, ask only whether the child is one of twins or triplets, taking chances on getting the information in rare quadruple or other births. Our

chief trouble, however, was to prevent the insertion of the answers to questions 20 and 21 in those spaces. The insertion of the words, "twins or triplets," in the place of the, to the midwives, unknown word, "plural," has been of some value, but even our marginal attempt at explaining the purpose of questions 4 and 5 have not met with entire success in always securing proper answers to those questions.

7. We have endeavored also to make more clear the desire for the use of a separate report for each child in plural births, by rewording the marginal instructions and substituting the word "blank," which seems more easily understood, for "return." We are still getting some twin births reported on one blank, because doctors, midwives and local registrars will not read the marginal instructions, and hope only by continuous correspondence and advertisement to impress upon all that such certificates constitute a report of neither birth. The loss of fifty cents in fees is our strongest aid in impressing the point upon the local registrars, at least.

8. The hundreds of blank spaces and irrelevant answers to question 6 in our old certificates, demonstrates that the term, "Legitimate" is entirely incomprehensible to the infantile intellects of our host of grannies, who hold in their dirt-laden hands the lives of thousands of mothers and infants. While we are getting many more replies since the substitution of the question, "Are parents married?" yet I am satisfied that our sisters in black still consider that matter one of minor importance, either way.

9. The men who imagine themselves so busy they they cannot take time to write the name of the month, we find are very apt to give the wrong figure when they endeavor to number rather than name it, in writing the date. We, therefore, in question 7, ask for the name of month, and follow up the request in a short set of rules for local registrars on the monthly report cards.

10. The Virginia Health Department desires to mail a bulletin on the care of the child to the parents of each legitimate infant reported. Our Bureau also sends a pink "birth-card," announcing that "the birth of a son is properly recorded in the Archives of the State," and a blue card, if the child is a daughter. These can be sent only when the mailing address of the father is given in question 9. They are sent only to those parents, also who are stated positively to be married, in question 6. In the early months of our work, from ten to ninety per cent., by counties, could not receive the bulletin or card, because of lack of accurate information as to legitimacy and mailing address. The inquiry as to *residence*, in the accepted standard form, usually secures the street address in cities, but is apt to be answered by the name of the county or state in rural sections. We, therefore, ask for the *postoffice*, which in the country is a more generally understood term than *mailing address*, and are now rarely failing to receive a correct answer. We consider the changed form of those two questions, 6 and 9, the most important of our recommendations.

11. Formerly, in answer to the inquiry as to *color*, we got numerous replies, such as "brunette," "blond,"

"light skinned," "dark," etc. The change to *Color* or *Race*, in questions 10 and 16, are preventing many replies of that character. I am not sure, however, that the word, "race," is sufficiently well understood, but with the joint use of the two terms, results are satisfactory. We thus learn also as to Indian, Japanese, Chinese, etc.

12. Question 14, in which the old form, which asks for the mother's "full maiden name," seems perfectly clear and simple. Experience teaches us, however, that in a large per cent. of replies the mother's given name, together with her marriage name, are given. We now ask in clearer terms for her "Name before marriage," and are failing in fewer cases to get the desired information, which in the future may be an important part of the record.

13. The next change occurs in question 21, and serves to make clear that we desire the birth being reported to be included in the number of the mother's living children. The change is simply a continuation of the form as given in question 20, but the sentences are printed as two lines, instead of one, each, owing to increased length.

14. In question 22 our underlined note serves to make clearer the meaning as to the hour a. m. or p. m.

15. Many local registrars and others make out certificates for illiterate midwives and sign their names without explanation, though they may be present. To make the signature legal, we have introduced the new space 26 for the local registrar, or other person, to sign in, as witness to the midwife's mark, which we ask for. This additional line necessitates a rearrangement of questions 24 and 25, by placing them on the same line. I consider this an important change, both from its possible legal bearing and to impress upon local registrars that the supposed signatures of others are not to be lightly affixed to certificates.

16. Our change of the explanatory note from its former position to that of a foot-note, renders the certificate less crowded, and brings the note itself out more prominently. It also permits us space to answer a question frequently asked, as to the period of utero-gestation, to be considered worthy a report. That of five months seems to have become by usage the accepted period.

We believe that our definition of a still-birth is more positive for the midwife than that on the accepted form. We say, "If a child breathes even once, it must not be reported as stillborn." The physician who detects a heart-beat is not prevented from considering the child a living birth, even though he sees no respiratory effort, while the midwife will never go further than to observe, as to respiration.

The space left vacant by change of location of the foot-note may be used for another question, if any city or state desires to ask, as to the use of nitrate of silver, educational attainments of parents, etc.

To prevent the writing of "unnamed," "baby not named," etc., in question 2, instead of the name, thus making it difficult afterwards to fill in the name from a supplemental report, an underline note might be included as follows: "If the child is not named, leave this space blank for future use."

THE ACTION OF CERTAIN BACTERIA ON THE NITROGENOUS MATERIAL OF SEWAGE.

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Instructor in Preventive Medicine and Hygiene, Harvard Medical School.

Read before the Laboratory Section of the American Public Health Association, Jacksonville, Fla., December 1, 1914.

THE bio-chemical work which has been done on sewage in the past has been confined almost entirely to the changes taking place in the various forms of filter beds in use at the present time. While we have considerable information concerning the bacterial action in the filter bed, our knowledge of this action in the septic tank is in a more chaotic state. What little we know is the mass action of all of those organisms, bacterial and otherwise, which play a rôle in the preparation of sewage for further treatment.

The primary object of this paper, which must be considered as a preliminary work, was to determine what the individual species of bacteria do chemically when allowed to act on sewage in pure cultures or symbiotically. It was hoped that something could be shown which would justify us in attempting to control the bacterial flora in large masses of sewage under treatment. It was expected that the results would enable us to say what we might expect if certain groups or species of bacteria proved to be present in predominant numbers.

It is reasonable to assume that mere numbers of microörganisms do not guarantee any definite chemical action. It is only when certain groups or species are predominant that a definite chemical change may be predicted or expected. At the present time we can make no prediction of this kind, because it is not known what group or groups of bacteria are responsible for those changes which are accepted as desirable.

In the past, work on putrefaction and decomposition has been confined largely to the study of the nitrogenous material, although there are certain other cycles, which as Fuller* points out must be quite as carefully studied. In conformity with past work along this line, it was decided to study the nitrogen cycle in relation to the changes taking place in the septic tank rather than the filter bed.

Clark† in his report on a somewhat similar investigation done at the Lawrence Experiment Station in Massachusetts, points out that there are five lines of action, *i. e.*, putrefaction, nitrification, denitrification, nitrogen liberation and nitrogen fixation. While undoubtedly all five of the processes go on simultaneously, the process which predominates depends entirely upon conditions present. His work was done in connection with the nitrification in filter beds, but it is reasonable to suppose that the same thing would hold true for septic tanks, except that the conditions are such, usually, that the putrefactive action is more likely to predominate, especially in the one-story type of tank.

* Fuller: Sewage Disposal, page 47.

† Clark; Report of the Mass. State Board of Health, 1904, page 244.

At the beginning of the work it was assumed that the ideal change in composition would be an increase in the free ammonia content, and a corresponding decrease in those decomposition products represented by the organic nitrogen, with little or no change in either the nitrites or nitrates should any be present. In order to bring about a conservation of the higher oxidation products of nitrogen, it is essential that sufficient oxygen be present so that the microörganism is not forced to reduce these substances to support life. I believe that at the present time it is considered wise to have as much residual oxygen as possible in the septic tank. I found, as I will point out later, that the action of certain bacteria, in fact nearly all of the particular species studied, was much more dependable under aërobic than anaërobic conditions.

Methods.

The methods may be criticised because it is impossible to simulate natural conditions in a laboratory experiment on a small scale.

In order to use sewage as a culture medium it is necessary to sterilize it, and any method of sterilization changes the chemical composition of the sample. It is therefore necessary to select that method which produces the minimum change.

Chemical methods are naturally out of the question, because of their ineffectiveness in bringing about complete sterility without a great excess of the chemical, which would have an inhibiting action on the bacteria subsequently added. This incomplete sterilization by chemical means has been shown by Lederer and Hommon* in their paper before this association at the meeting of 1910.

If the gross solid material is filtered out, the sewage can be sterilized by heat, practically without affecting the chemical composition.

While there is a difference in composition between the unsterilized and sterilized sewage, the differences in the flasks of sterilized sewage made up from the same large sample are so slight as to be negligible.

The sample of sewage was filtered through cotton to remove the gross solid material, made up into liter lots and sterilized at 120° C. (15 pounds pressure) in the autoclave for 45 minutes. Two sets of flasks were made up at a time for each series, one set was treated with paraffin oil to give anaërobic conditions; the other set was left without the oil to favor aërobic conditions. In each set there was one flask which acted as a control. The changes in those flasks which were inoculated with bacteria were measured against this control, after making allowances for the difference in composition and errors in the methods.

In connection with the dissolved oxygen content, the preliminary work brought out several interesting facts. It was found that the heat of sterilization would in itself drive off the greater amount of dissolved oxygen, and that the flasks which were not treated with paraffin oil would pick up oxygen rapidly, even at the temperature of the incubator, 37.5° C. On the other hand, those which had been treated with paraffin oil continually

* Lederer and Hommon; *Jour. Am. Public Health Association*, Vol. 1, (New Series), 1911, p. 267.

lost what little dissolved oxygen there was left. There is no doubt but that the unsaturated hydrocarbons of the oil extracted the dissolved oxygen, and did it so rapidly that at the end of twenty-four hours there was, for all practical purposes, none left.

The flasks were inoculated twenty-four hours after sterilization with one cc. of a twenty-four hour bouillon culture of the bacteria to be studied, and incubated at 37.5° C. for twenty-four hours. They were then analyzed for free ammonia, organic nitrogen, nitrites and nitrates according to the Standard Methods for Sewage Analysis.

Sewage.

The sewage was obtained from the Ward Street Pumping Station of the Metropolitan System of Boston, and was typical of an average domestic sewage. The district served by this pumping station is mainly residential, there was probably a small amount of manufacturing wastes and some storm water. Care was taken to obtain the samples at the same time of day, so that the sewage would have a similar composition throughout the work.

Bacteria.

The bacteria chosen for the work were not isolated from the sewage itself. It was thought better to use bacteria of known stock, typical of those groups which are normally found in sewage. For this reason, B. coli communis; B. cloacæ; B. pyocyaneus; B. proteus vulgarus, B. mesentericus ruber and B. subtilis were selected. All of these have either been reported as having been isolated from or are representative of groups normally occurring in sewage.

The bio-chemistry of these bacteria, when grown on artificial media, shows that they possess characteristics which, theoretically, at least, should be of value in breaking down a complex organic substance such as sewage. The only exception to this statement is possibly the power of B. coli to reduce nitrates. It will also be recalled that all of them are facultative anaërobes.

The action of the bacteria when grown symbiotically brought out two very interesting points. One was the behavior of B. coli. Invariably in the anaërobic flasks it was completely overgrown in the twenty-four hour period. Under aërobic conditions it overgrew B. pyocyaneus, but was overgrown by the other bacteria.

The other fact was that B. proteus vulgarus and B. subtilis overgrew the other bacteria in the proportion of three to one under all conditions. When these two were grown together they about balanced each other at the end of the twenty-four hour period.

The Action of Pure Cultures.

The action of pure cultures was studied under two conditions of temperature, at 37.5 ° C. and at room temperature. A summary of the results follow:

B. coli.—There was a marked tendency to decrease the nitrites and nitrates, with a very decided decrease in the organic nitrogen. This was more marked in the anaërobic than the aërobic flasks, and was much more vigorous at 37.5 ° C. There was very

little action on the free ammonia, the general tendency being to decrease it.

It was noted that the correction for the amount of organic nitrogen added to the samples in the bouillon, tended to give, in all of the experiments, a reduction of the organic nitrogen. This was studied in the hope that some intermediate decomposition products might be found to account for it. At the present time I am unable to explain it in any other way than that the standard methods may tend to give results too low, and that possibly some of the nitrogen is liberated.

B. cloacæ.—In general it may be said that this microörganism did not materially differ from B. coli. The greatest action was on the nitrites and nitrates, which were decreased markedly in both the anaërobic and aërobic flasks. There was also a decided tendency to decrease the amount of free ammonia. This was not constant.

B. pyocyaneus.—At 37.5° C. the action was irregular. At times the nitrites and nitrates were increased and under apparently the same conditions they were decreased. The same holds true for the free ammonia and organic nitrogen. There was nothing to indicate that the oxygen content of the samples had any effect on the action.

At room temperature the action on the free ammonia and organic nitrogen had the same irregular tendencies that were noted above.

This irregularity was also noted in the aërobic flasks in connection with the nitrites and nitrates. In the anaërobic flasks the nitrates were decreased with an increase in the nitrites. This increase and decrease nearly balanced.

B. proteus vulgarus.—This also showed a marked irregularity in its action at 37.5 °C. At room temperature the action was more constant, the free ammonia being increased with a corresponding decrease in the organic nitrogen. The nitrates were increased with a corresponding decrease in the nitrites. This activity was more marked in the anaërobic than in the aërobic flasks, and I believe that with this microörganism, better results can be obtained under anaërobic, or nearly anaërobic conditions, than where the oxygen content is relatively high.

B. mesentericus ruber.—This has nearly the same characteristics as the previous microörganism, the action being irregular in the experiments conducted at 37.5° C., while even those at room temperature were more constant, especially under anaërobic conditions. At the lower temperature the free ammonia was increased and the organic nitrogen was decreased. The nitrites were, in the majority of the experiments, increased, with no changes in the nitrates. Under aërobic conditions at room temperature, both the nitrites and nitrates were increased, while the organic nitrogen was decreased. These changes did not balance, leaving a large deficit in the organic nitrogen which has not been satisfactorily accounted for.

B. subtilis.—This microörganism gave really consistent results. These were obtained under aërobic conditions and confined themselves to the free ammonia and the organic nitrogen. There was in all of the experiments an in-

crease in the free ammonia with a decrease in the organic nitrogen that practically balanced it. This activity was relatively very great, amounting to as much as eight parts per million at 37.5° C., and two parts per million at room temperature. In regard to the nitrites and nitrates, the tendency was more often to decrease than to increase them. The action was not constant.

Under anaërobic conditions the action of the bacteria was regular at 37.5° C., both the free ammonia and organic nitrogen being decidedly decreased with an increase in the nitrites and nitrates, the latter being very decided. At room temperature the action was not so marked and in general followed that of the aërobic conditions, showing an increase in the free ammonia and a decrease in the organic nitrogen.

From the results which were obtained, I believe that this microörganism and the entire group of allied bacteria will bear much careful study in their relation to the bacterial processes in the purification of sewage.

The Action in Symbiotic Growth

I have already pointed out that in symbiotic growth B. coli was completely overgrown in the anaërobic flasks, and was overgrown by all of the bacteria in the aërobic flasks, with the exception of B. pyocyaneus. Also that B. subtilis and B. proteus vulgarus overgrew the other bacteria in both sets of flasks. When grown together they about balanced each other.

Chemically the fact that the action very closely followed the predominating bacteria was extremely interesting. The action was in certain cases, as I will point out later, very different in the aërobic and anaërobic flasks with the same bacteria. This difference was particularly noticeable when B. subtilis and B. coli were grown with other bacteria.

Although the action of the symbiant was at times apparent, the time of incubation was in some cases evidently too short for the predominating bacteria to manifest itself chemically. This was plainly evident where more than two bacteria were inoculated into one flask. In these cases also it is to be noted that B. coli dropped out of sight in twenty-four hours in both sets of flasks. In those flasks where all of the bacteria were grown together the overgrowth of B. proteus vulgarus and B. subtilis was apparent, but it was not sufficient to markedly affect the chemical results.

A summary of the results follow:

B. coli and B. cloacæ.—I have pointed out previously that these two organisms have almost the same action on sewage. The results when grown together are quite different from what might be expected, especially in the aërobic flasks. Here the free ammonia was increased with a corresponding decrease in the organic nitrogen. The nitrites were also decreased. No changes were noted in the nitrate content. Apparently the presence of B. coli was a decided advantage in the early part of the incubation period, since it was greatly overgrown in twenty-four hours.

The overgrowth in the anaërobic flasks was probably much quicker

than in the aërobic flasks, and was much more complete. The chemical changes noted in this set of flasks are those of a pure culture of B. cloacæ. The only exception being that neither the nitrites or nitrates were attacked.

B. coli and B. mesentericus ruber.—The changes here are those due almost entirely to B. mesentericus ruber, especially in the anaërobic flasks.

In the aërobic flasks the small number of B. coli present affected the results so that they were very irregular.

B. coli and B. pyocyaneus.—In spite of the fact that B. coli overgrew B. pyocyaneus there were no changes which could be attributed to either microörganism. Evidently B. coli established itself so late in the incubation period that the little chemical effect it might have had was not apparent.

B. coli and B. proteus vulgarus.—In pure culture both of these bacteria had a slight and irregular chemical action; however, when grown symbiotically the changes in composition were regular and consistent. Under both aërobic and anaërobic conditions there was an increase in the free ammonia and a decrease in the organic nitrogen. No changes were noted in either the nitrites or nitrates.

B. coli and B. subtilis.—Under aërobic conditions the changes were those of a pure culture of B. subtilis, *i. e.*, an increase in the free ammonia and a corresponding decrease in the organic nitrogen. Except in one case where there was a slight increase in the nitrites, neither the nitrites or nitrates showed any change.

As I have noted, neither of the bacteria have a regular chemical action at 37.5° C. under anaërobic conditions. However, when grown symbiotically there is an increase in the free ammonia and a decided decrease in the organic nitrogen. This increase and decrease balanced each other.

Neither the nitrites or nitrates were affected in any way.

Just what the explanation for this condition is, I am unable to say at the present time, as B. coli was completely overgrown.

B. subtilis and B. cloacæ.—In the aërobic flasks, in which B. subtilis markedly overgrew B. cloacæ, the chemical changes were typical of B. subtilis. The free ammonia was increased with a corresponding decrease in the organic nitrogen.

The nitrates were decreased with an increase in the nitrites.

Under anaërobic conditions where the overgrowth of B. subtilis was not apparent, the chemical changes were in the main those of B. cloacæ, differing from those of the pure culture in the tendency towards increasing the nitrites and nitrates.

B. subtilis and B. mesentericus ruber.—In the aërobic flasks the action was irregular, resembling that of B. mesentericus ruber. Both the nitrites and nitrates were increased.

In the anaërobic flasks the free ammonia was increased with a corresponding decrease in the organic nitrogen and nitrites. The nitrates were unaffected. This, except for the decrease in the nitrites, follows very closely what was found under similar

conditions for B. mesentericus ruber in pure cultures. The cultures, however, showed a considerable overgrowth of B. subtilis.

B. subtilis and B. pyocyaneus.—Under aërobic and anaërobic conditions the bacteria grew practically equally.

In the aërobic flasks the free ammonia and the organic nitrogen were decreased, while the nitrites and nitrates were both increased.

Under anaërobic conditions the free ammonia was increased with a decrease in the organic nitrogen and nitrites. The nitrates were unaffected.

B. cloacæ and B. mesentericus ruber.—B. mesentericus ruber overgrew B. cloacæ in both sets of flasks.

Under aërobic conditions the chemical action was more irregular than was found for B. mesentericus ruber in pure culture, but in general coincided very closely to it. The most marked effect was on the nitrites and nitrates. The nitrates were decreased with an increase in the nitrites.

In the anaërobic flasks the action was much more typical of B. mesentericus ruber, the free ammonia being increased with a decrease in the organic nitrogen.

The nitrates were decreased and the nitrites increased.

B. cloacæ and B. proteus vulgarus.—The action of these bacteria was very irregular and typical of neither. This was true for both aërobic and anaërobic conditions.

The nitrites were generally increased.

In one experiment all of the nitrogen was reduced in amount.

B. proteus vulgarus and B. mesentericus ruber.—Under aërobic conditions the action followed that obtained with B. mesentericus ruber. The free ammonia was increased and the organic nitrogen was decreased correspondingly.

In the anaërobic flasks the tendency was to decrease both the free ammonia and the organic nitrogen, while the nitrites and nitrates were increased. These results follow those obtained from B. proteus vulgarus more closely than B. mesentericus ruber.

The cultures showed a slight overgrowth of B. proteus vulgarus in the anaërobic flasks.

B. pyocyaneus and B. proteus vulgarus; B. pyocyaneus and B. mesentericus ruber.—Neither of these gave any results under either aërobic or anaërobic conditions.

The chemical results in those experiments in which four of the bacteria were inoculated into one flask were very irregular and disappointing. The time of incubation was apparently insufficient for any one or two bacteria to establish themselves sufficiently to affect the chemical composition of the sewage.

In the experiments in which all of the bacteria were inoculated into one flask there was but one change worthy of note. That was the increase of the nitrates in all of the experiments. This was found under both aërobic and anaërobic conditions, amounting in one instance to six parts per million. There was a decided decrease in the rest of the nitrogen present.

Summary and Conclusions.

Certain bacteria have been studied to determine their effect upon sewage. Those selected were B. coli communis, B. cloacæ; B. pyocyaneus, B. proteus vulgarus, B. mesentericus ruber and B. subtilis. They were selected because they represent aërobic types which are found frequently or constantly in sewage. The effects of these bacteria were studied in fresh sewage, filtered and sterilized by heat at 120° C. (15 pounds pressure) for forty-five minutes. They were studied under aërobic and anaërobic conditions, also in pure cultures and in symbiosis. Particular attention was paid to the effects on free ammonia, organic nitrogen, nitrites and nitrates.

Bacteriologically it was shown that B. coli was completely overgrown under anaërobic conditions in the twenty-four hour period. Under aërobic conditions it was able to overgrow B. pyocyaneus, but was overgrown by the rest of the bacteria studied.

When grown in pure cultures, with the exception of B. proteus vulgarus, the bacteria gave more constant results under aërobic than anaërobic conditions.

B. subtilis showed a marked ammonifying power throughout the work under aërobic conditions. Under anaërobic conditions it regularly decreased the free ammonia and organic nitrogen content, increasing the nitrites and nitrates, especially the latter.

B. coli and B. cloacæ had a decided reducing action on both the nitrites and nitrates. Under some conditions, as yet undetermined, they reduced the free ammonia content also.

B. proteus vulgarus had a considerable ammonifying power under anaërobic conditions. This was very slight under aërobic conditions and was more constant at room temperature than at 37.5° C.

The action of B. pyocyaneus and B. mesentericus ruber was irregular under both aërobic and anaërobic conditions.

The experiments in symbiosis showed that the chemical changes followed very closely those of the predominant bacteria in pure culture. Those experiments which did not follow this rule, and in which there was a decided predominance of one microörganism showed that the bacteria had become predominant too late in the incubation period to affect a marked chemical change.

B. coli and B. cloacæ; B. coli and B. proteus vulgarus gave more constant results when grown symbiotically than when grown in pure culture. These were the only instances of an apparently true symbiotic growth.

The results of the experiments, in which more than two bacteria were grown symbiotically, showed that the incubation period, twenty-four hours, was too short to allow any one microörganism or any group of bacteria to establish itself chemically.

The work has shown that we will be able to predict what the changes in the chemical composition of sewage are going to be if a group or species of bacteria are predominant.

The results of this work would certainly not justify us in attempting

to control the bacterial flora of the septic tank. However, I am strongly convinced that in the future this course may be justified.

The results obtained from B. subtilis should again be emphasized. Everything indicates that this micro-organism may be made to play a most important rôle in the treatment of sewage.

THE PREPARATION OF AMMONIA-FREE WATER.

EDWARD J. PUGH,
Thomas A. Scott Fellow; Laboratory of Hygiene; University of Pennsylvania.

Read before the Laboratory Section of the American Public Health Association, Jacksonville, Fla., December, 1914.

IN THE ordinary course of water analysis, ammonia-free water must be prepared by distilling water and rejecting the first portion which contains most of the ammonia. With a new apparatus or one which has not been used for some time it frequently takes several hours of distilling to drive the last traces of ammonia out of the condenser. This tiresome process must be repeated each time ammonia-free water is wanted unless the still is run continuously. The experiments mentioned in this paper were made in order to try to obviate this difficulty by precipitating the ammonia.

Nessler's solution was made according to the formula given in the Standard Methods of the American Public Health Association.

Ammonia-free water for comparison was made by distilling Philadelphia tap water; rejecting the first third and redistilling after adding a few drops of sulphuric acid to hold back traces of ammonia.

The author intended to form some precipitate in the water after adding Nessler's reagent and try to precipitate the ammonia by mass action.

The most satisfactory results were obtained by adding 40 cc. of Nessler's solution to the tap water and then adding an emulsion of alumina cream until a permanent flocculent precipitate remained on shaking. It was then allowed to settle for half an hour and filtered through a wad of asbestos wedged into the stem of a large funnel. The first third of the filtrate is generally cloudy and must be refiltered by pouring it back onto the same filter; as the pores of a filter must become clogged before a clear filtrate can be obtained. The asbestos must be ignited to remove all traces of ammonia. Since the water obtained by this process already contains the proper amount of Nessler's solution it is not necessary to add any. In making up color standards definite portions of ammonium chloride are added to the ammonia-free water in long 50 cc. Nessler tubes and mixed by pouring from one tube to another. The standards prepared in this manner are as clear as those prepared from water which has been freed from ammonia by distillation and will keep about the same length of time without precipitating. They have a slightly different color but this is not noticeable unless large amounts of ammonia are present. This objection, however, is not very great since solutions containing large amounts of ammonia should always be diluted before matching colors. Theoretically the process should be cheaper than the distillation process since no gas is used for heating the water. I still have some of the water I prepared

about two months ago and it is just as good now as when it was first prepared.

Experiments were made to determine the feasibility of filtering through alundum by suction but the filtrate was always cloudy and had a slight color due to the presence of iron. Filterpaper or cotton cannot be washed free from ammonia very easily and consequently are unsatisfactory.

It was thought that good results might be obtained by adding alum or aluminum sulphate to the water containing Nessler's solution and forming the precipitate in the solution but the results were not altogether satisfactory. It seems as if large amounts of sulphates interfere with the reaction.

Ferric chloride and ferric hydroxide were tried in place of the aluminum but traces of iron always remained in solution and were sufficient to give a color to the filtrate. Mercuric chloride will carry down the color if very small amounts of ammonia are present but will not precipitate all of it if there is much present. Mercuric iodide continues to crystallize out of the solution for several days so that the solution should stand some time before filtration or else be filtered again. Even under the best conditions mercuric chloride does not remove the color as well as the aluminum hydroxide. In water containing much mineral matter sodium carbonate seems to precipitate out most of the ammonia along with some of the inorganic matter, but at the same time desensitizes the Nessler's solution so that more must be added in order to give a color with ammonia.

The conclusion is that ammonia-free water can be prepared quickly and cheaply by adding aluminum hydroxide to water containing Nessler's solution.

REPORT OF THE COMMITTEE ON INDUSTRIAL HYGIENE AND SANITATION OF THE HOME.

DR. JOHN H. LANDIS,
City Health Officer, Cincinnati, Chairman.

Read before the Public Health Officials Section, the American Public Health Association, Jacksonville, Fla., December 2, 1914.

IN THE 1913 report of this Committee, attention was directed to the work of the Sanitarians of Organized Labor, an organization including delegates from the labor unions of Cincinnati and representatives from the local health department.

Meetings are held twice each month on Sunday morning and are well attended. In addition to the educational value they possess, the following is a brief summary of work accomplished during the year ending August, 1914.

Seventy-two insanitary conditions in workshops and factories, of a general character calling attention to bad toilets, faulty plumbing, common drinking cups, dry sweeping, improper and inadequate ventilation, spitting on the floor, etc., were reported. Insanitary conditions in dwellings were reported in twenty instances; overcrowding in tenements, four; outside privy vaults, thirty-two; dangerous cisterns, six; and catch basins, four. Under the head of miscellaneous conditions, such as uncovered manure boxes, dumps, ravines, stagnant pools, uncollected garbage and ashes, filthy chicken coops, dirty floors and lack of cuspidors and filthy toilets in public places, were reported and investigated.

In all, one hundred and eighty-one complaints were cleared through the Sanitarians of Organized Labor. Twenty-four lectures were given before the unions by speakers furnished through the health department in coöperation with the Academy of Medicine.

Through complaints received from the Painters' Union, the United States Government detailed Dr. Alice Hamilton to investigate the hygiene of the painters' trade in Cincinnati.

It is not to be assumed that industrial hygiene is being handled adequately by this organization. Its main object is to eliminate conditions in workshops and factories which are recognized as predisposing factors in the development of tuberculosis. Reports on bad conditions outside of these places are solicited, every precaution being taken in all instances to suppress the source of the information received.

It is recognized that while our work does accomplish a little in correcting bad conditions, the chief benefit is derived from its educational influence. Men become familiar with danger signals and are on the lookout for them.

In the majority of the states, industrial hygiene is under the control of workshop and factory inspectors who may or may not know just what are their duties. Too often appointments are a reward for political services

rendered. Many of the appointees have the same comprehensive knowledge of a blower system that the average man has of the fourth dimension. We get what the general level of intelligence is entitled to, and that almost invariably means "the short end." Some of the great corporations are doing an immense amount of good in their "safety first" campaigns. The vast majority of employers, however, have not yet learned that defective working units make a heavy drain on output and earnings.

Industrial hygiene must be approached from two angles to correct faulty conditions. The worker must be shown the danger to his life and health, and the employer, the money waste due to the resultant lowered efficiency. When workers in industrial hygiene become discouraged over the slowness with which results are obtained, it is wise to take stock. They will be surprised at the immense strides that have been made in the course of a few years.

At present the State Board of Health and the United States Public Health Service are engaged in surveys in Cincinnati that should be of great benefit to industrial hygiene in that city. The state is studying industrial diseases, and the federal government is making a comprehensive survey of the tuberculosis situation with special reference to those trades which show an abnormal prevalence of tuberculosis among its workers.

In Cincinnati, the board of health is working for an appropriation that will permit us to place one man, a physician, on full time in the epidemiological study of tuberculosis and two other physicians on full time in industrial hygiene. It is believed that this will be a much more satisfactory way of solving a difficult problem. As all appointments are made through the civil service, it insures the elimination of abuses which inevitably accompany political control.

What is needed is not more laws, but an intelligent enforcement of those already written and the dissemination of the knowledge that their enforcement will benefit both capital and labor.

Attempts to improve sanitary conditions in the home have only a transient influence when expended on the domicile itself. In the vast majority of instances, people create their own environment. An insanitary home is one of the effects of causes placed in operation long before the final effect is observed. It must be perfectly obvious that efforts expended wholly and solely on end results can have no influence on the causative factors. While a comprehensive clean-up is a good thing, it bears about the same relationship to a permanent clean-up that hospital care of typhoid fever patients does to eradicating the sources of that disease.

An insanitary home is usually a symptom of something radically wrong outside the home.

The problem grows greater from year to year, because the interests active in manufacturing end results create vicious circles which perpetuate themselves.

Newly arrived immigrants add to the problem, because old world ideas of

economy bring them in close contact with vicious influences. Government supervision of these people, with compulsory educational laws, would be a form of national insurance that would do much to solve the problem.

Three hours a week in a night school would, in the course of several years, make American citizens out of these people one generation in advance of the time now required. It would mean a citizenship based on intelligence, not merely on so many years of residence. It would have an enormous influence in curtailing disease, poverty and crime, and would winnow out those undesirables who should be deported for the public good.

Anyone who imagines that our present method of handling aliens is perfect, will quickly revise his ideas if he will visit, in turn, a police court, refuge home, general hospital, and other charitable and correctional institutions.

To those apprehensive souls who see in every attempt at creating a better citizenship, a subtle attack on "personal liberty," it may be pointed out that native Americans have the first say in determining the quality of citizenship in this country and that they have an inalienable right to do whatever is necessary to insure self preservation.

Great good is being done through school inspectors, nurses, and social workers to improve home conditions, but their efforts merely scratch the surface. The bulk of what is being done now is curative when it should be preventive. No sanitary problem is solved quickly or permanently by caring for its victims.

Discussion.

Dr. Hayhurst (*of the Ohio State Board of Health*): Among some of the first things that have to be settled in relation to this question of industrial hygiene and occupational diseases is the establishment of a set of standards for industrial health tests. We have got to be able to go into a place when we investigate it, with a definite idea of what is the standard in relation to ventilation, to light, to the amount of dust that may be in the atmosphere for a given length of time; what is the standard for the amount of poisons, poisonous fumes or vapors, according to the different kinds to which a person may be subjected during a certain period? In the state of Ohio we have been attempting in the last two years to make a survey of industrial hygiene as the fundamental cause behind occupational diseases and attempted to apply ten different health hazards to every working department in which we have found men employed, and have attempted to grade those health hazards as good, fair or bad. The report of that will be published within the next six weeks or so, as nearly as we have been able to get at it. Our worst drawback has been the lack of some standard upon which to base opinions, and that is the controversy every time when it comes to directions. It also has seemed to me that for a large class of working people, particularly our foreigners, the place to attack social delinquency is right at the work place. If those men are set examples of insanitary conditions, faulty hygiene, for ten or twelve hours of the day when they are awake at their work places, we cannot expect them to do any better at their homes and in their habits.

The report of the Committee was adopted.

REPORT OF COMMITTEE ON OCCUPATIONAL MORTALITY.

DR. W. F. SNOW, *Chairman.*

Read before the Vital Statistics Section of the American Public Health Association, Jacksonville, Fla., December 3, 1914.

IN PRESENTING its report for consideration the Committee desires at the outset to define the field of inquiry which it believes should be covered. The Section on Vital Statistics has generally been recognized as dealing with deaths, births, and marriages. In a study of occupational mortality the Committee believes it essential to include morbidity as related to occupation. A study of economic conditions and the slow working changes of physical and mental deterioration—the health-hazards—due to occupational requirements and environment are essential to a profitable study of the problem, and these data can be obtained with completeness only during the lifetime of the patients. The Committee also believes that the possible application of studies in occupational mortality should be steadily borne in mind and has therefore included brief reference to needed legislative and administrative measures which demand serious consideration by public authorities and private agencies.

Accordingly, as a basis for its discussions, the Committee has assumed that the field of inquiry covered not only occupational mortality, but also morbidity and certain predisposing factors. Death is the culmination of a process. Deaths from occupational diseases are preceded by longer or shorter periods of illness. These deaths are largely preventable, and can be so prevented only by closely studying the cases before their fatal termination. There are, first, the deaths resulting from industrial accidents; second, there are deaths resulting from so-called occupational poisonings of which lead poisoning, arsenic poisoning, mercurial poisoning are illustrations; third, there are the occupational infections such as anthrax, tetanus, and possibly hookworm among miners, and the occupational traumas due to extreme alternation of the physical conditions under which the normal physiological operations of the body are carried on—caisson disease being an illustration; and finally there are the deaths, perhaps most important of all, which result from conditions of a more diffuse character. In this last group the conditions resulting in death are general, complicated, and often insidious in character. The occupation in these cases aggravates the morbid conditions which commonly affect large numbers of the population.

"Pulmonary tuberculosis" may be taken as an illustration of this fourth group. This is an occupational disease from this point of view, for quarrymen, certain groups of the textile workers, garment workers, and others. The figures that are now available point out distinctly that these groups

show higher mortality rates for the working periods of life than do corresponding age groups of all occupied persons of the same sex. On further analysis the higher mortality can be traced to a higher incidence of "pulmonary tuberculosis." This is so constant over long periods of time and in different countries that we cannot escape the conclusion that the particular kind of work done by these groups carries with it a higher incidence of tuberculosis.

What is thus indicated to be true of tuberculosis is probably true in varying degrees of a number of other diseases. Increased knowledge of our occupational stress on life and health is our chief desideratum at this time. We must have the facts with regard to occupational mortality and morbidity in this wider sense.

To obtain these facts the Committee recommends the intensive study of local problems in this field presented by the chief occupations of each community. The health departments, with their vital statistics and inspection equipment, in coöperation with other public and volunteer agencies, have a great opportunity to do this. The living conditions, age, occupational environment, character of illnesses being treated by the local physicians, evidence of physical deterioration during service, the mortality—are all factors requiring accurate tabulation and comparison. The full reporting of occupational data for all deaths needs constant emphasis. The practicability of collecting this information has been demonstrated by such investigations as Doctor Schereschewsky's study of garment workers, Doctor Hayhurst's work with lead workers and potters in Chicago and Ohio, Doctor Goldwater's investigations of New York City employees and licensed peddlers, Doctor Hansen's work in Massachusetts, Doctor Sachs' work in Chicago, Doctor Tucker's study on cement workers, and the many other observations of workers in textile mills and various trades.

In addition to intensive studies in recognized industrial centers, there is need for state and municipal departments systematically tabulating the data relating to a selected group of diseases: for example, tuberculosis, chronic nephritis, organic heart disease, and rheumatism. This information collected for all parts of the United States and preserved with the best obtainable occupation data would be a valuable aid in ultimately obtaining a series of death-rates for the important diseases in which occupation is a major factor.

The Committee has included for purposes of discussion two tables:—

I. Occupation classification for practical studies of occupational mortality and morbidity.

II. Selected causes of death for tabulations in studies of occupational mortality.

These tables have been worked out by Dr. Louis I. Dublin after careful studies of occupation as a factor in all the diseases and deaths included in the international classification. The Committee suggests the possibility of dividing this group among the several states and thus planning correlated studies during the coming year, covering practically the whole list. For

example, certain states could supplement the work of the Massachusetts State Boards in studying physical deterioration due to occupation; others could supplement the study of occupations involving metallic poisoning and special factors brought out by the Ohio survey. It is recommended that progress reports along these lines could be published advantageously by the United States Public Health Service in its weekly Reports.

The Committee believes special efforts should be made to develop active coöperation between vital statisticians, health officers, labor commissioners, and officers of compensation boards.

The importance of liberalizing our compensation laws by including occupational diseases should be emphasized. Hand in hand with this movement should go an endeavor to popularize forms of sickness-insurance in the several states as a wise method of distributing the costs involved in any scheme for extension of compensation laws.

The members of your Committee have corresponded with investigators in this field, statisticians, and others, and the Committee considered carefully the advisability of extending this report by including quotations and data from the correspondence and information collected. Since most of the important studies of occupation in relation to morbidity and mortality have been published, and bibliographies exist, it seemed advisable to place before you only this series of suggestions for the development of future observations.

In summary these suggestions for your discussion are:—

(1) Increased emphasis on reporting of occupational morbidity and mortality to health departments.

(2) Intensive studies of local conditions in industrial centers.

(3) Interstate coöperation in limited statistical tabulation of general data collected.

(4) Development of wider coöperation among state and private agencies in the application of occupational data to illness and prevention.

(5) The working out of a standard nomenclature upon industrial processes.

In recommending its discharge the Committee suggests the inclusion of the study of occupational morbidity and mortality in the work of some standing committee of the Association, or the selection of the subject for a symposium of experts in the program of one of the sections.

Dr. John B. Andrews,
Mrs. John B. Andrews,
Dr. Louis I. Dublin,
Dr. John W. Trask,
Dr. William F. Snow, *Chairman.*

MASSACHUSETTS ASSOCIATION OF BOARDS OF HEALTH.

THE quarterly meeting of the Association was held at the Pemberton Inn, Hull, Mass., Thursday, July 29, 1915, under the presidency of Dr. M. J. Rosenau.

The following were elected to membership in the Association: Dr. E. Alden Dyer, 506 Washington St., Whitman; Harry C. Rice, Secretary, Board of Health, Framingham; Miss M. J. Cook, Superintendent, Melrose Hospital, Melrose; Dr. Edwin A. Locke, 311 Beacon St., Boston; David J. O'Connell, Esq., Chairman, Board of Health, North Easton; Dr. Howard A. Streeter, Chairman, Board of Health, Marblehead; Dr. Geo. T. Little, Secretary, Board of Health, Uxbridge; Mrs. Harriet Minot Laughlin, 50 Commonwealth Ave., Boston; Frank W. Murphy, 111 Pleasant St., Clinton; Robert J. Carpenter, New Kimball Bldg., North Adams; Dr. Walter W. Kingsbury, 11 High St., Malden; Dr. C. E. Prior, Chairman, Board of Health, Malden; William S. Johnson, 101 Tremont St., Boston; Andrew F. Allen, City Hall, Waltham; Charles H. Adams, Mayor of Melrose; Dr. Gharabed S. Ghazarian, 594 Tremont St., Boston; Dr. John D. Hilton, Agent, Board of Health, Swansea.

The chair announced the appointment of the following committee with regard to the following up of all cases where trouble was alleged to follow vaccination: Dr. S. H. Durgin, chairman; Dr. F. G. Wheatley, Dr. F. G. Curtis, Dr. L. A. Jones, and Mr. John Ritchie, Jr.

The following letter from Dr. R. N. Hoyt was then read.

WELLESLEY HILLS, MASS.,
June 24, 1915.

DR. FRANCIS H. SLACK,
Boston, Mass.

My dear Dr. Slack:

I believe there is a great need of improvement and standardization of the local health regulations in Massachusetts. I have corresponded with Dr. Eugene Kelley of the State Department of Health who states that, while his department is making a study of the subject, they fear to recommend a model set of rules and regulations on their own initiative lest local boards of health feel something is being forced on them.

Would it not be possible for a request to be sent from the Massachusetts Association of Boards of Health to the State Department, asking them to take up this work, and would it not be well to appoint a committee of the Association to assist the State Department of Health in this work?

If there is any committee of the Massachusetts Association of Boards of Health through whom this movement should be communicated, I would be glad to correspond with that committee. I should be very glad for your suggestion as to how this matter may be brought up.

Sincerely yours,
ROBERT N. HOYT.

It was voted that the Chair be authorized to appoint a committee of nine members of this Association to coöperate with the State Health Department on this question. The committee appointed is as follows: Dr. Robert N. Hoyt, Wellesley Hills, chairman; Dr. Frank W. Jackson, Brockton Board of Health; Dr. Edgar H. Guild, Springfield Board of Health; Dr. Clarence J. Allen, Winchester Board of Health; Mr. John A. Cook, Provincetown Board of Health; Mr.

David J. O'Connell, North Easton Board of Health; Mr. Raymond L. Newcomb, Salem Board of Health; Mr. George T. Lennon, Haverhill Board of Health; Mr. F. W. Howe, Framingham Board of Health.

The following paper on The Incorrigible Consumptive,—The Isolation of Persons Ill with Communicable Diseases, by the late Chester Bryant, formerly agent of the Haverhill Board of Health, was read by Dr. Elliot Washburn, Superintendent of the Rutland Sanatorium.

THE INCORRIGIBLE CONSUMPTIVE—THE ISOLATION OF PERSONS ILL WITH COMMUNICABLE DISEASES.

CHESTER BRYANT,
Formerly Agent of the Board of Health, Haverhill, Mass.

THE problem of the vicious, incorrigible consumptive is one that probably no community of any size has escaped, and it has seemed to me that the legal side of the problem and the lack of a definite specific law whereby the unteachable, incorrigible and drunkard consumptive, who refuses to heed any demands of the health authorities, may be compulsorily segregated, are not the least trying of the many difficulties against which health officials have to contend.

The Massachusetts law makes it mandatory upon boards of health to care for this class of consumptives regardless of their conduct or their habits, and we fully understand this and know that under the present inadequate health laws, or the court's interpretation of them, we are absolutely helpless to remedy the present unfortunate condition of affairs.

The law requires each city to provide hospital accommodations for persons sick with tuberculosis and to aid them in other ways, but I do not for a moment believe that it was the intention of the legislature that patients of the class to which I have referred should themselves run and control these institutions which are built and maintained for the comfort, treatment and relief of persons ill with tuberculosis, at a considerable expense to the citizens who supply the money for their maintenance.

If these drunkards and troublemakers refuse to obey the rules and become otherwise objectionable in our state sanatoria, they are simply discharged from these institutions; but it is a duty, as I have said, made mandatory upon the city where these patients have a legal settlement, not only to make provision in some way for them, but to protect our citizens against the spread of tuberculosis as well.

This class of patient does just as he pleases at the hospital, goes out when he pleases and returns when he pleases, not infrequently under the influence of liquor, grossly insults the nurses and attendants, and absolutely refuses to obey the rules of the institution.

Our local tuberculosis hospitals are

not prisons, and there is no way by punishment, that I know of, to compel a person ill with tuberculosis to obey the hospital rules or to enforce the reasonable requirements of their management. Altogether, their conduct is such as to upset all discipline, and there should be some way to prevent them from seriously impairing or destroying the usefulness of our local hospitals. Already it is difficult enough to induce tuberculosis patients to enter them, and if there is no way to remedy the conditions that I have tried to describe, we might just as well close up the hospitals at once, because decent and self-respecting tuberculosis patients cannot be induced to enter them for treatment.

We have had two men in our hospital for more than five years and during that period we have paid out between three thousand and four thousand dollars for their board, clothing, etc. Both of them are alcoholics and unmanageable, although everything possible has been done for their comfort and welfare and to make them contented. One of them has been in the Lakeville State Sanatorium once and three times in the state sanatorium at North Reading, and their conduct while at these institutions was such that their superintendents felt compelled to notify us that these two patients will not be readmitted. One of them we were afterwards compelled to discharge from our tuberculosis hospital, on account of the trouble that he made for the attendants and the patients and the superintendent, who threatened to resign if he were not cared for elsewhere. Being obliged to provide for him in some way, we arranged to board him at a restaurant until other provision could be made for him. He is now maintained in a small portable cottage, which he occupies alone, on the city hospital grounds.

If we are to arrive finally at the complete control and ultimate eradication of tuberculosis, we must have laws, clear and specific, and reasonably administered, for the compulsory care of advanced cases of tuberculosis, a surprisingly large number of whom are ambulatory and alcoholics, who are unwilling to carry out essential sanitary precautions.

Dr. Bradford Pierce of Cambridge diagnoses the situation pretty accurately when he says, "If we are to have the responsibility let us have the authority and respect necessary for us to assume it."

Consistent, insistent and persistent efforts to educate the young so that they may know how to avoid infection, the backing and coöperation of local courts to secure the rigid enforcement of laws and regulations, clear, specific and definite, in the case of sufferers from this malady, and the erection and maintenance of a special state hospital where incorrigible and careless tuberculosis patients may be committed, similar to disposing of the common drunkard by the courts or magistrates for care and treatment, are the only methods that will ever reduce tuberculosis to a negligible factor in any community.

Under the authority of the Massachusetts legislature, repeated investigations and reports upon the system of caring for tuberculosis have been

made. The last report was made this year by a special recess committee of the legislature. Accompanying the report of this committee were two bills, providing for the care, treatment, removal and segregation of incorrigible tuberculosis patients.

It is to be regretted that these bills failed of passage in the legislature, for I confidently believe that by their enactment into law very great benefits would have accrued. Just why they were rejected by the committee to whom they were referred, no one seems to know; but it was probably due to the prevailing notion in the minds of many of our law-makers that health officials, who are struggling honestly and faithfully to serve most helpfully, and not possessed of sufficient intelligence, honesty of purpose, discretion and trustiness to avoid arbitrary exercise of authority conferred upon them.

But the movement for the suppression of tuberculosis has just begun, and there are, therefore, many loose screws in the machinery. Take, for instance, the discontented patient. He becomes tired of the hospital in his "settlement town" where he is being cared for, and feels the need of a change of environment. Without saying a word he packs up his traps and goes to Boston, Brockton, Springfield or to whatever town he may select. So in a few days a notification is received that he has been received into a nearby or a distant tuberculosis hospital, and a demand is made for reimbursement for the expenses of his board and treatment at this hospital. There is no law by which to compel his return to the town of his legal place of settlement; and the law makes it mandatory upon the board of health of the city that the patient has selected for his place of residence to provide for him, and the patient's "settlement town" must pay the bills for his hospitalization, although such town may have a hospital of its own—perhaps ordered by the State Board of Health—properly equipped, with expensive hospital facilities, with abundant room and with plenty of nurses and attendants with little to do, because patients that should be there are in hospitals in other cities where they do not properly belong. It is surely most essential that some means should be devised to prevent this extravagant system of caring for our tuberculosis patients.

There is need, too, of some restriction to prevent indigent sanatorium patients from marrying. I recall the case of a patient whose board we had been paying for quite a long time at a sanatorium. He and a woman patient at the institution obtained permission to remain away from the institution for a day or two. The day after they left they were married and both returned to the institution. The man had a Haverhill settlement, but the woman had never gained one, at least not in Haverhill. The moment she married, however, she took her husband's settlement, which made our city liable for the expense of the support of both the man and the woman. They are still in a sanatorium at our expense, and if children should be born of this marriage, they, too, will become public charges, and the tax-

payers of Haverhill must pay the expense of their support.

It is obvious, if we are to make any headway in the suppression of tuberculosis and in materially lessening unnecessary expense, all must combine, and it is incumbent upon us to use our personal efforts to have our laws changed or amended if they do not furnish the protection or accomplish the purpose desired, and put a stop to a condition of affairs that is little short of medieval.

Our attempts to isolate persons ill with communicable diseases other than tuberculosis, and to make proper provision for their medical care, have sometimes been disheartening. To cite one or two cases may be of interest.

A girl, eleven years old, was ill with typhoid fever. She was a member of a Polish family, consisting of the father and mother, and, including the sick girl, four children. Their dwelling was a one-story, two-room structure, consisting of a kitchen and a sleeping room for the whole family. There were no house sewerage facilities, and the liquid wastes were thrown on the surface of the ground. The privy-pit, simply a shallow hole dug in the ground, was open at the back, permitting the access of flies to the excrement deposited therein, and its contents overflowed on the surface of the ground about twenty feet distant from a well used as a source of water supply for the family, and only a few feet distant from the dwelling. Mounds of human excrement were scattered about the yard, including stools from the patient, and the two living rooms were swarming with flies from the yard and the privy pit. There was no physician in attendance upon the sick child, and at the time of my second visit in company with our city physician, the patient carried a temperature of 103° and a pulse of 140. The mother was absent at work in a shop, but the father happened to be at home at the time of this visit. After every possible effort had been made to obtain the father's consent for the removal of the sick child to the hospital, an application was made to the District Court to warrant such removal. Although there is no provision of law for it, the judge refused to issue the warrant without a hearing to the father, who must be given twenty-four hours' notice, and not even then until the record of the Board of Health showed a vote declaring that "in the opinion of the Board, the patient could not be properly isolated in her home." All these proceedings occupied a great deal of time. In the meantime, the girl continued to grow worse.

At the hearing in the court after summons to the parent, the father was finally induced to consent to the removal of the child and the warrant was, therefore, not served.

If, instead of a minor child sick with typhoid fever, the case had been that of a man ill with smallpox, for example, and the afflicted person had demanded and the court required a hearing, the situation would have been a serious one for the citizens of Haverhill. This situation, under the present laws of Massachusetts, or the court's interpretation of them, is liable to appear at any time.

By careful nursing at the hospital,

notwithstanding the delay in providing for her proper care, the patient made a very good recovery and there was no spread of typhoid fever from this case.

B was the case of a man ill with scarlet fever, and suffering from temporary mental derangement. A few days after, this man, of powerful physique, was isolated at his home, he became violent, and his wife and the attending physician applied to us for assistance in restraining him. He had escaped from his home and was, after a prolonged search, found in a stable connected with an ice-house, running about the place armed with a pitchfork, and threatening to attack any person who approached him. He was finally induced to return to his home, and we secured the services of a special policeman to nurse and restrain him. Later he became so violent that it required the services of three men to restrain him, and put him in a straight jacket to prevent possible injury to himself. We then applied to the court to have the man temporarily committed under the provisions of one of two statutes, the one providing that "persons suffering from diseases dangerous to the public health may be removed to a hospital on a warrant issued by the court," and the other under the law providing for the "temporary commitment to an institution of a temporarily insane person who is in need of immediate care and who is cared for by the board of health."

The judge would allow neither. Two physicians filed information that the man was ill with scarlet fever and was suffering from mental derangement, and was at the time insane although they believed that he would recover his reason. The judge informed me that he had no authority to issue a restraining order or warrant without a hearing, which, of course, considering the man's condition, was absolutely impossible. I called the attention of the judge to the fact that there was no provision of law for a hearing in the case of a commitment to a hospital of a person sick with a disease dangerous to the public health. To this he answered "that it was the inherent right of every man to be given a hearing, and that he didn't care if twenty-five persons contracted scarlet fever from exposure to a scarlet fever patient, and declared that he would order no one committed without a hearing." Shortly after this consultation, the man again escaped from his bed, jumped from a second-story window, and disappeared until eleven o'clock that night.

After the court's decision, the physician in attendance did not again dare to place the man in a straight jacket, and the police department refused to give the board of health further service. Unable to have the man committed or to restrain him at his home, despite the pleas of his wife who was badly frightened, we were in a quandary as to what course of procedure to take. Finally, however, the attending physician was able to get in touch with members of a fraternal organization to which the patient belonged, and this organization sent men to nurse and guard him. It is superfluous to say that the attitude of the courts is of vital importance to health officials

in their efforts to conserve the health of the people.

The impression has arisen that the powers granted to health departments for the purpose of safeguarding the public health are so sweeping in character that they have in their own right practically limitless power. Necessarily extensive as these administrative powers are, it is a misapprehension to conceive them as absolute. Both in practice and in theory the effective action of health boards depends upon the courts, and a health officer's efforts are often rendered idle unless these courts stand ready to apply the just force of the law when convinced of the facts.

Some of the judges that preside in our law courts do not appear to be men of very great breadth of vision. They were lawyers before they were judges, and in their zeal to protect the rights of the individual they sometimes appear to lose sight of the fact that communities have some rights, which it is the duty of these judges, as paid public officials, to assist in safeguarding.

It is essential that a greater degree of confidence should be placed in the judgment and discretion, and the spirit of fairness and sincerity and good faith of health officials, who presumably are better qualified to pass upon questions of health and sanitation, and of what is necessary to be done without delay, than anyone else.

Doctor Evans of Chicago once said, in referring to the law as it relates to health boards, "If these decisions (of the courts) are studied, it will be found that in many instances the judges have had to read facts into the evidence and quite frequently they read expert opinion as well. These facts and opinions are usually the opinions of the judges based upon their observations of matters of everyday life. There are certain lines in which their experiences eminently qualify these gentlemen. There are others where they do not."

There is a suggestion of such kind of judicial interference in a recent decision of the Supreme Court of the State of New Jersey, in the case of the Board of Health of Cranford Township in Union County versus Court of Common Pleas in and for Union County et al. To quote it may be interesting:

"It is not," the court said, "within the legislative intent, in enacting legislation conferring upon local boards of health the power to prescribe quarantine regulations in a district or locality infected with a contagious disease, to subject the discretion of such boards to the review of the local courts for the purpose of substituting the judgment of such tribunal for that of the board to which the power is specifically committed."

It may be of interest to this conference to know that last year a case arose on the petition of habeas corpus in the Supreme Court of Massachusetts, brought by Andrew McCarthy against the superintendent of our city hospital. McCarthy alleged in substance that he had been taken without a hearing before a magistrate, that he was forcibly detained and that he did not have tuberculosis. Upon the hearing before Judge ———, the medical testimony was that he was

infected with tuberculosis. We tried very hard to have the court consider the legal situation with reference to the constitutionality of the statute, but he refused to do this and remanded the petitioner to the custody of the agent of the board of health of Haverhill, on the general grounds that the man was better off at the city hospital than at home. While the decision as it stands upon the record was averse to the petitioner, the case as decided did not in any way clear the legal question, and throws no light one way or the other. In an off-hand way during the progress of the case, Judge ——— said he doubted the right of any board of health to take a person infected with tuberculosis without a hearing before a magistrate, but he declined to decide that point of the case, so that his remarks were merely dicta. This man was taken to our hospital on a warrant issued by one of the judges of the Central District Court in Haverhill, under the provisions of section 46 of Chapter 75 of the Revised Laws, which reads as follows:

"A magistrate authorized to issue warrants in criminal cases may issue a warrant directed to the sheriff of the county or his deputy, or to any constable or police officer, requiring him, under the direction of the board of health, to remove any person who is infected with contagious disease, or to impress and take up convenient houses, lodging, nurses, attendants and other necessaries. The removal authorized by this section may be made to any hospital in an adjoining city or town established for the reception of persons having smallpox or other diseases dangerous to the public health, providing the assent of the board of health of the city or town to which such removal is to be made shall first have been obtained."

To the ordinary man on the street both the language and the intent of this statute would seem to be quite clear and unmistakable; but the super-strict and technical narrow-mindedness of trial judges, or at least some of them, does not permit them to give this statute, in the interest of public health, a broad and liberal interpretation in order to carry out its manifest and wholesome purpose and object.

Discussion.

MR. PRENDERGAST: As one of the trustees of the four state sanatoria, I cannot agree with the previous speaker. I think the worst element that we have in the success of those hospitals is the incorrigible, and we will continue to have him. In fact, in one of our institutions we have to discharge at least two patients a week as being incorrigible, being ones that we cannot do anything with, who are a menace to themselves and a menace to the other patients. In regard to the couple referred to in the able paper which was so well read by Doctor Washburn, I would say that that couple has turned out very well indeed. The only time they broke the law was when they fell in love; I believe there is no law against that, because I believe that wherever there is love there is some fever. The young couple, at the suggestion of Doctor Washburn, was transferred to one of the other institutions; since that time, about twelve months ago, the wife was discharged as cured and is learning to become a nurse, and yesterday I got a report from the same institution that the husband has just been discharged as improved and has been hired as an orderly, both giving excellent satisfaction.

But I think that one of the greatest problems that we have in the control and cure of tuberculosis is the incorrigible, and we have them where they travel from one institution to the other, and when they are discharged from one the greatest amount of influence is brought to bear to put them back again. I firmly believe that you will never succeed in the care and cure of tuberculosis unless you have a separate institution for the control, against their own wishes, of the incorrigible and not merely a boarding place as they have now.

Doctor Durgin: I have been thinking since I heard this paper read that I must have been recently guilty of violating the law very often. I am under the impression that the statute law of Massachusetts justifies every local board of health in seizing any case of infectious disease and not only placing it in safe-keeping, but in holding him until he is a safe party to go abroad in the community. That is what we did in Boston. Moreover, in Boston, whenever there was manifest liability that some infectious patient in the city hospital was likely to be taken out while yet infectious the board of health was notified, the patient's room properly placarded and an order sent to hold that patient until it was thought best, by the physician in charge, to release him. That was law in Boston. I believe the same authority exists in every local board of health in the state of Massachusetts. I should avoid the courts as much as possible in cases where the patient is properly placed.

Dr. Sumner Coolidge: I wish to express my hearty approval of every word of the paper that has been read. As superintendent of a state sanatorium now nearly six years I have had a little experience with the class of patients that is referred to in this paper. Doctor Durgin has told us what they do in Boston. Perhaps Doctor Durgin does not know that 50 per cent. of my cases come from Boston. When they catch the case in Boston, they have got him, and I presume they handle him well, but when he cuts up in my institution so that it is impossible to keep him there I wonder how long it is before Boston gets hold of him again. We have cases that seem to me high-grade imbeciles. We have wilfully malicious fellows. We have men and women simple in their own conceit, who should be placed in this class. I don't call them incorrigible; they are a class of people who refuse to be controlled, to have their actions controlled and their conditions controlled. There are people, apparently as intelligent as we are here, so conceited that they do not take the doctor's word; the demonstration of tubercle bacilli does not convince them that they have got consumption, and they go about from one hospital to another or from one boarding house to another, spreading the disease. From any point of view there is necessity for some special treatment of this class of consumptives. Economically, there certainly is reason. I have had individuals admitted to my institution three separate times, each time make a fair recovery to a condition that may be called quiescent, in which they say, "I feel able to work." "I am going out to try it." "We have only got one life to live." "I am going to take the chance," etc. They have remained in the institution perhaps nine months or a year after each admission, and have used up some good money of the city or the state. And by the way, just about four or five per cent. of my people now pay their own way. The disease of having their expenses paid in these institutions by the town or the state is very catching, and they have all caught it. As I say, less than five per cent. are paying their own way. A good lot of money is spent to put these men on their feet. A case in question was that of a man who had been in my institution about two years. The other day as one of my assistants rode slowly up the avenue at Nantasket he saw a man some distance ahead fall on the sidewalk. He said that man was so drunk he could not even turn over after he fell down. As he came up to the man he recognized this ex-patient of ours whom we had worked with, and whom the city of Boston had paid for, wallowing in the dust and dirt. That fellow has not come back, but he will come back. As I say, I have had them come three times. That is the economical standpoint. Medically, what can we say of these patients that go home against advice or misbehave in the institutions? It seems to me that the conceited ones, the ones who love their families so much, and have small children at home, not necessarily the dissipated ones, are the most dangerous to the rising generation. Something has got to be done to teach them that the community has rights. And socially!

Well, I hardly know what to say about this matter socially, but this is no time to theorize about it. The fact confronts us that there is a large class of patients—not the majority by any means, for most of our people are law-abiding, self-respecting people, who conscientiously try to get well—who demand compulsory segregation. I say it is a disgrace to our institutions, it is utterly wrong for us to keep in these institutions a set of people who make it impossible for the conscientious ones to get their rights, and at the same time make it impossible for the tuberculosis workers to do efficient work outside the institution.

Doctor Durgin: I think, Doctor, that your local board of health has the right to authorize you to keep him if you choose to keep him. I agree with you that it is a great nuisance in such an institution. We had the same trouble at Lond Island, and we had to authorize them as agents to hold the patients there just the same. But I think your local board of health has the authority under the law to restrain that party in your institution.

Doctor Coolidge: The city of Boston, you see, has a fine hospital in which to care for these patients after they seize them. The average small town may have the authority to seize them, but has no place to put them, and they are in a dilemma worse than ours. If we keep them in our institution, they sometimes purposely misbehave. They say,—in talking about the matter to other patients—"I would like to get fired." "I would like to try this or that other institution." It is a real dilemma that small town boards of health find themselves in very often having no place in which to care for incorrigibles.

Doctor Durgin: I think they ought to be by themselves.

Doctor Coolidge: It is impossible for us to keep them.

Doctor Denny: I think this topic appeals to every board of health; we are all anxious to see something done. We have discussed this same question several times before, and now we would like to feel that this Association is working on the problem. I would therefore move that the Chair appoint a committee of five to consider this problem and to make recommendations.

Doctor Durgin: I second the motion.

Mr. Prendergast: I would like to have in that motion, if Doctor Denny would incorporate it, that that committee either report back to this Association or report a bill to the legislature recommending some legislation that will clearly define the rights of holding incorrigibles against their own wishes. I think we ought to do something besides just pass motions.

The President: Does Doctor Denny accept that as an amendment?

Doctor Denny: Yes.

Doctor Washburn: I would like to ask Doctor Durgin if any of these patients whom he held ever carried their case to the court. It is easy enough to hold a man if he does not object to being held.

Doctor Durgin: No.

Doctor Washburn: In this Haverhill case, the man objected and went before the court, and the judge refused to uphold what Doctor Durgin considers to be the law, and which very likely is the law.

Doctor Denny's motion was adopted.

The following committee was appointed: Chairman, Mr. Seymour H. Stone, Boston; Dr. F. P. Denny, Brookline; Mr. Daniel L. Prendergast, Boston; Mr. R. P. Borden, Fall River; Dr. Sumner Coolidge, Middleboro.

The following paper by Dr. Francis George Curtis was then read:

SOME INCONSISTENCIES IN DEALING WITH TUBERCULOSIS.

FRANCIS GEORGE CURTIS, M. D.,
Chairman, Newton Board of Health.

TO THE local board of health, upon whose shoulders the responsibility for the care of persons ill with tuberculosis first falls, the position taken by the state authorities in regard to many aspects of the tuberculosis question seems illogical and the measures which they require the local boards to carry out seem burdensome and impossible of fulfillment.

The different state departments with which the local boards come in contact when dealing with tuberculosis are the State Department of Health, the State Board of Charity, the trustees of the hospitals for consumptives and sometimes the courts.

The State Department of Health, acting under the power delegated to it by the legislature, has declared tuberculosis, in all its forms, a disease dangerous to the public health, and by doing so has put certain responsibilities on the local boards.

These responsibilities are defined by two agencies—first, the general statutes dealing with all diseases dangerous to the public health and, second, certain special statutes passed by the legislature from time to time dealing specifically with tuberculosis.

Under the general statutes, the duties and powers of the board of health when dealing with any disease dangerous to the public health are laid down.

Sections 32 to 42 of Chapter 75 of the Revised Laws as amended by Section 1 of Chapter 365 of the Acts of 1906, provide, among other things, that each city shall establish a hospital for the care of persons sick with diseases dangerous to the public health; that the board may cause any sick or infected person to be removed to such hospital or place, if it can be done without danger to his health, otherwise the place where he remains can be turned into a hospital and be subject to the regulations of the board.

Section 43 of the same Chapter 75 of the Revised Laws provides that if such a disease (*i. e.*, a disease dangerous to the public health) exists in a town, the selectmen and the board of health shall use all possible care to prevent the spread of infection.

Section 46 of Chapter 75, as amended by Section 2 of Chapter 365 of the Acts of 1906 provides how the removal shall be accomplished, presumably if the patient is refractory.

The specific laws in regard to tuberculosis direct that all cities shall provide hospitals for the care of tubercular patients and further that these same cities and all towns of over 10,000 population shall maintain dispensaries for the free examination and treatment of tubercular patients.

To summarize: The city, under penalty of a fine, must provide for the tare of poor persons who are ill with

tuberculosis by furnishing hospital accommodations, dispensary treatment, medical attendance, medicine, nursing, food, clothing, etc., and all this without any regard to local conditions or to the necessity for such provision, in any given community.

There is a plethora of law to provide for the care of the sick and the protection of the public.

Now let us see how these things work out in actual practice.

Owing to the propaganda established by boards of health, anti-tuberculosis leagues and similar agencies, the laity, having learned that tuberculosis is a communicable disease, has acquired a very lively fear of "catching" it and demands loudly that something shall be done to protect the public.

While this is a very worthy desire, its practical application is hardly logical. To the excited layman a case of tuberculosis is a case of tuberculosis, of the "Great White Plague," and must be taken care of at once.

Even if he has lived in the same house with it for months in perfect serenity, before he knew what it was, the moment a physician pronounces the dread word "tuberculosis," it becomes fearsome and not an instant must be lost before something is done with it. He can't even wait twenty-four hours.

It makes no difference whether the patient is in the incipient stage and is well cared for at home or whether he is a drunken incorrigible in the last stages, something must be done to protect the public, preferably by sending the case to a hospital.

The layman has also learned that the board of health is responsible, by law, for furnishing the necessary care and so he bombards the office with demands that it shall act.

The incongruity of it is that the layman is right; it is the duty, under the law, of the board of health to prevent the spread of infection, by sending the patient to a hospital or by other means, and yet, under the interpretation of that same law, it is practically helpless.

The board of health is made responsible, by law, for the safety of the public and the care of the sick person, but, in the case of a person sick with tuberculosis, it is denied the means of enforcing measures to insure that end.

No matter how careless the patient may be, he is at liberty to go about, as long as he is physically able to do so, and the board of health cannot prevent him. It cannot isolate him at home nor can it put him in a hospital against his will.

Even if the board can persuade him to go to a hospital, a hospital which it has been compelled by law to build and maintain for such as he, it cannot keep him there, if he wishes to leave. If he prefers to stay and break every rule it cannot discipline him except by throwing him out, which is simply avoiding the issue.

There must be something radically wrong with a system which permits the existence of such a condition.

The chief difficulty seems to lie in the fact that while tuberculosis has been declared a disease dangerous to the public health, persons ill with tuberculosis are put on a different plane from persons ill with other

diseases of the same class, and the courts, or some of them, will not give boards of health the necessary backing.

To the ordinary person, it seems clear that the law intends that boards of health shall have the power to remove to a hospital, forcibly if necessary, a person with a disease dangerous to the public health.

Section 36 of Chapter 75 of the Revised Laws as amended by Section 1 of Chapter 365 of the Acts of 1906, says: "The board of health may cause any sick or infected person to be removed to such hospital or place, if it can be done without danger to his health."

Section 3 of the same chapter says: "The provisions of Sections 36 and 46 of the Revised Laws so far as they confer authority for the removal of patients from their homes, shall apply only in case of persons residing in boarding houses or hotels, or in the case of two or more families occupying the same dwelling, or in other cases in which, in the opinion of the board, the case cannot be properly isolated."

It seems perfectly clear that it is the board of health and not the courts which shall decide whether or no the patient shall be removed.

It is difficult to understand the attitude of the courts, unless, indeed, they fear that this power will be abused by boards of health or else that they lay too much stress upon the rights of the individual. As for the first, boards of health are composed of earnest, careful men, doing their best to protect the communities which they serve and very reluctant to resort to the strong arm of the law until every means of achieving the desired result has been exhausted, while as for the second, the individual must always yield to the general good of the community.

Let us suppose that the patient has been induced to enter a hospital and, on looking up his history, it is found that he has no settlement but is a "state case." In this event the commonwealth is responsible for his care but the place of residence must first pay the bills and then transmit its claim to the State Board of Charity for audit and approval.

Section 1 of Chapter 386 of the Acts of 1906 says: "Reasonable expenses incurred by the board of health of a city or town or by the commonwealth in making the provision required by law for persons infected with smallpox or other diseases dangerous to the public health shall be paid by such person or by his parents, if he or they are able to pay, otherwise by the city or town, in which he has a legal settlement." . . . then follow directions about determining the settlement and the section ends: "If the person has no settlement such expense shall be paid by the commonwealth upon approval of the bills therefor by the State Board of Charity."

There is a question here about the interpretation of the words "reasonable expenses." It may cost the city fifteen dollars a week to care for the cases, but all that it can get from the state is seven dollars per week, thus penalizing the place of residence in the difference between this amount and the actual cost of caring for the case.

If the city puts in a claim for the

subsidy, the State Board of Charity promptly reduces its payment to two dollars a week, and tells the city to collect the subsidy from the trustees, so that all the city gets in any case is seven dollars. Of course this defeats the object of the statute allowing the subsidy, as a subsidy is a gift, not a payment for work done.

Again, when a state case has been sent to a sanatorium, thus relieving the local board of responsibility, it often happens that the patient becomes dissatisfied and leaves, "against advice," returning to the locality from which he was originally sent. He again becomes a charge of the local board and in this event the red tape becomes so snarled as almost to destroy any hope of untangling it. The local board having once reported the case to the State Department of Health and the State Board of Charity, proceeds in its innocence to incur further expense on his behalf and, having done so, forwards its claim for reimbursement, only to be met with the ruling that the case is a new one and before the claim can be allowed, it should have been reported, not only to the State Board of Charity but to the State Department of Health under Section 52 of Chapter 75 of the Revised Laws as amended by Chapter 480 of the Acts of 1907 and, as the board has failed to do so, the claim is thrown out.

When one considers that under this ruling, the same man may be reported to the State Department of Health, by the same locality, several times, comment seems unnecessary.

Another thing which adds to the difficulties of local boards, is the peculiar position taken by the trustees of the hospitals for consumptives in regard to the admission of patients to state sanatoria.

By a recent decision of the courts any physician may file an application for admission of a patient without notice to the local board of his intention to do so. This is acted upon by the trustees and in due time the patient is admitted, and all that the board of the place of settlement has to say about it, is what it says when it has to pay the bills.

This is the only instance with which I am familiar where a private citizen can of his own initiative place a lien upon the municipality, but under the decision referred to, it is perfectly legal and no fault can be found, but fault can be found with the fact that the trustees will accept a physical examination by any physician as evidence of the necessity for sanatorium treatment. They do not ask for a positive sputum. Whether or not the presence of tubercle bacilli in the sputum is a necessary sign of danger, may be ignored for the present, but the fact remains that persons who have persistently shown a negative sputum have been admitted and readmitted to sanatoria, sometimes the history extending over several years, and have been paid for by the local board as cases of tuberculosis.

Let, however, the local board claim the subsidy for a case cared for in a local hospital and before the trustees can approve the claim, an affidavit is required that tubercle bacilli have been

found in the sputum and, as if that were not enough, the examination must be made at a laboratory approved by them.

In other words, if the trustees have a claim on the local board, a simple physical examination is sufficient to declare a patient a fit subject for admission to a sanatorium but, if the local board has a claim upon the trustees, an affidavit of the presence of tubercle bacilli is demanded. Surely this is the acme of inconsistency!

It is easy to point out faults but difficult to show a practical remedy, although it seems as if, in the matters referred to, almost any change would be for the better.

As far as the first difficulty is concerned, the remedy seems simple; the real problem is in the treatment of the incorrigible, a matter already spoken of in another paper.

I believe that the law confers upon boards of health the necessary power to put a patient in a hospital, leaving it to the courts to carry out their rulings. The non-tubercular alcoholic can be sent to an institution and kept there against his will, and the same treatment should be dealt out to the tubercular alcoholic. For the non-alcoholic incorrigible, of which there are not many, the formal action of a board of health stating that, in its opinion, after careful consideration, he requires restraint, should be honored by the courts. Boards of health can be trusted not to abuse their powers and should be sustained.

This would also do away with the practice of discharging patients from sanatoria "against advice" or as a measure of discipline—a practice which seems illogical. If the patient was suitable for sanatorium treatment when admitted, he is no less so because in a few weeks he becomes discontented and wishes to leave.

Reasonable expenses should be interpreted as the actual cost of caring for the case, not as an arbitrary amount. In paying for a "settled case," the place of settlement has to pay the actual cost to the place of residence, and the commonwealth should do the same. If necessary, an itemized statement showing how the rate is calculated could be submitted.

In cases where the subsidy is allowed, the amount of the subsidy should be paid in addition to the reasonable expenses, for, as already stated, a subsidy is a gift given as a reward, not a payment for services rendered.

State cases which have been discharged from or have left a sanatorium, when asking for aid again, should be accepted by the Board of Charity on a simple aid notice and should not be required to be reported again under Chapter 480 of the Acts of 1907.

Under the decision of the courts already referred to, nothing can be done in regard to the admission of patients on private applications, although a statute might be drawn requiring the indorsement of the local board in cases for which it is liable to be called upon to pay.

The trustees should give the same treatment to local boards in the matter of calling patients who are public charges tubercular, that is accorded

to them by law when the local boards desire the subsidy.

I believe that the smoothing out of these differences would tend to lessen the friction which at present exists between the state and local boards and go a long way toward increasing coöperation between bodies which should work together in harmony.

Discussion.

Mr. Seymour H. Stone: Mr. Chairman, may I ask Doctor Curtis two questions? He says that non-tuberculous alcoholics can be sent to a hospital. Will he let us know which hospital non-tuberculous alcoholics can be sent to? Also he makes the statement that the subsidy is a gift from the state. As I understand the law, it infers that the subsidy is to be paid for the board of patients at the local hospital.

Doctor Curtis: I said that non-tuberculous alcoholics could be sent to an institution—not to a hospital—to a state institution, Foxboro, for instance.

Mr. Stone: Is it not necessary to have the consent of the patient? The patient is not forcibly sent, is he?

Doctor Curtis: I think sometimes they are sent forcibly by the courts. Chapter 579 of the Acts of 1911, as amended by Chapter 637 of 1912, provides: "Every city or town which places a patient suffering from tuberculosis in a municipal or incorporated tuberculosis hospital in such commonwealth shall be entitled to receive from the commonwealth a subsidy of five dollars a week for each patient who is unable to pay for his support." This is a letter from Mr. Goodhue, in which he quotes the law—this is in regard to a specific case—and ends:

"It therefore appeared to this division that in the case of Luther Kenalian, the city of Newton was entitled to the subsidy of five dollars per week, and your claim was allowed under the opinion of the Attorney-General at two dollars per week, being the balance, less the subsidy, of maximum allowance of seven dollars per week."

That is, as I stated, they take the subsidy as a part of the payment, though I think almost any definition of subsidy is a gift. That is an opinion of Attorney-General Malone, added to by a verbal statement, it is not in writing.

State Board of Charity,
Boston, Jan. 26, 1914.

Francis George Curtis, M. D.,
Chairman Board of Health,
Newton, Mass.

Dear Sir:

In reply to yours of the 22d inst., the provisions of Chapter 579, Acts of 1911, as amended by Chapter 637, Acts of 1912, provide:

"Sect. 1. Every city or town which places its patients suffering from tuberculosis in a municipal or incorporated tuberculosis hospital in this commonwealth, shall be entitled to receive from the commonwealth a subsidy of five dollars a week for each patient who is unable to pay for his support, or whose kindred bound by law to maintain him are unable to pay for the same, but a city or town shall not become entitled to this subsidy unless, upon examination authorized by trustees of hospitals for consumptives, the sputum of such patients be found to contain bacilli of tuberculosis, nor unless the hospital building or ward be approved by said trustees, who shall not give such approval unless they have by authority of law, or by permission of the hospital, full authority to inspect the same, at all times. Said trustees may at any time withdraw their approval."

The rules and regulations adopted by the trustees of hospitals for consumptives under the provisions of Chapter 579, Acts of 1911, and Chapter 637, Acts of 1912, in part, are as follows:

B. The commonwealth will not be liable for the subsidy for more than thirty days prior to sending requests for state subsidy for any given patient.

C. The state subsidy of five dollars per week per patient whose sputum contains tubercle bacilli may be granted for,

(a) Indigent cases having local settlements in the town or city requesting the subsidy.

(b) Certain indigent cases having legal settlement in the commonwealth, but cared for in hospitals or wards approved by the board.

D. The state subsidy shall not be granted for cases having legal settlement in other towns.

It, therefore, appeared to this Division that in the case of Luther Kenalian the city of Newton was entitled to the subsidy of $5.00 per week, and your claim was allowed under the opinion of the Attorney General at $2.00 per week, being the balance less the subsidy on the maximum allowance of $7.00 per week.

Respectfully,

F. W. Goodhue,
Superintendent.

Doctor MacKnight: I would like to ask Doctor Curtis three questions. First, if a patient is admitted to a sanatorium by an order of the court, how must he be discharged therefrom? By an order of the court? Second,—

The President: Hadn't we better have the questions one at a time, and then we won't get confused?

Doctor MacKnight: All right. How is he to be discharged, having been admitted by order of court?

Doctor Curtis: Well, not being a lawyer I don't know that I could answer that exactly, but he could be admitted under an order of the court exactly as a case of scarlet fever can be. When the authority, Doctor Coolidge, says he is well, then he can be discharged. They discharge some.

Doctor MacKnight: The next question is —what a board of health can do after paying the sanatorium rate for one of its tuberculosis patients. Has it any control in the determination as to the length of time that patient shall stay in the sanatorium, providing they (the board) are willing to pay the bill? or third, because he is simply incorrigible, can he be turned out, without the consent of the board of health paying his way?

Doctor Curtis: The board has absolutely no control over the length of time. I have paid for cases that have been about four years, I think, or five years, in state sanatoria. They have no control as to keeping them there or sending them out—I think that is right, absolutely no control.

Doctor MacKnight: The next question is whether the board of health in whose jurisdiction the sanatorium happens to be has any control as to what shall happen to the patient once he is discharged from the sanatorium walls and premises into the confines of that town.

Doctor Curtis: I could not answer that. I would refer it to Mr. Prendergast.

Mr. Prendergast: I would say he came back into the control of the local board of health. We have got enough of them. We make it a point to notify the local board of health, the local tuberculosis society—don't we, Doctor?—(Doctor Coolidge) and the State Board of Charity, that we have discharged that man, and give the address he is supposed to go to.

The President: It seems to me that the difficulties that had been brought up so far about the incorrigible consumptive and the difficulties surrounding the details of administration, both legally and otherwise, are really rays of hope in the whole question of the control and suppression of tuberculosis. When you come to think that it is only since 1882, a short thirty-three years ago, that the tubercle bacillus was discovered, and of course a much shorter time since active measures were undertaken by the provision of the courts and of legislative bodies generally, progress, while it has not kept up with science in the knowledge of the facts, has really been in the main fairly satisfactory, and these difficulties which, while they are important difficulties and are often very annoying, are nevertheless what might be called minor questions involved in the whole great question, and certainly will be solved.

The next item on our program is Concerning Tuberculosis Dispensaries. This discussion will be opened by Mr. Seymour Stone of Boston.

Discussion Concerning Tuberculosis Dispensaries

MR. SEYMOUR STONE: I think we all admit that tuberculosis is still a great problem. While we have made great progress in diminishing the mortality from tuberculosis, we still have in our state in one year a total of 5,400 deaths. If this death-rate is to continue to drop, we must do more intensive work. The cases must be discovered in earlier stages. Other members of the family in which there is tuberculosis must be examined, particularly the children. Many physicians and experts are now beginning to believe that tuberculosis, as a rule, originates in childhood; and, if this is the case, we certainly should have the children, at least of tuberculous families, under very close supervision. Then, again, the patient who is discharged from the sanatorium or hospital, whether state or municipal, should be under some local supervision. The trustees of hospitals for consumptives have an after-care worker, as probably most of you know, whose labors have clearly demonstrated the need of much more follow-up work by boards of health and other local organizations, in connection with patients discharged from sanatorium or hospital, whether the patients are incipient or advanced cases, it being, indeed, even more important to keep track of the advanced than of the incipient case.

One of the best means of accomplishing this more intensive work is the tuberculosis dispensary. The state recognized the value of this institution when it passed the law which requires cities and towns of 10,000 inhabitants and over to establish tuberculosis dispensaries. There are 54 such cities and towns in the state of Massachusetts. Very little was done to comply with this law until the beginning of the current year, when the Health Commissioner notified these communities that unless they lived up to it they would be liable to prosecution and subject to a fine of five hundred dollars. It is an interesting fact that every one of the 54 cities and towns has now complied with the law by establishing a tuberculosis dispensary. There are, it is true, six or seven cities and towns in which the dispensaries have not received the final approval of the State Department of Health, but the difficulties are minor ones and undoubtedly will very shortly be adjusted and the dispensaries approved. There are representatives of the State Department of Health here, and I hope that they will enter this discussion and tell us a little more in detail the actual working of this very interesting law.

The success of these dispensaries now depends very largely upon the attention given to them by the local boards of health and by such local organizations as the anti-tuberculosis society, the district nursing association, and any other civic body interested in the eradication of tuberculosis. The dispensary must be brought more forcibly to the attention of the general public; in other words, it must be given publicity. Where dispensaries have been started in cities and towns and have had very little to do, the principle reason for this condition has often been that the public has not known of the existence of such an institution. Just as soon as the dispensary is given publicity in these places it begins to find plenty to do. If I am not mistaken, Brockton, which has kept its dispensary before the public through the newspapers, is an illustration of this point. I saw the other day where this city had in one day twelve patients, six of whom were new. If this is the case in a city the size of Brockton, there must certainly be more cases that should come to dispensaries in the larger communities.

There are different methods of advertising a dispensary, and the same method will not work equally well in all communities. In the smaller towns it may be best not to keep the dispensary too constantly in the public eye, but certainly in the larger communities it ought to be given a great deal of publicity. This may be done through newspaper articles. The local anti-tuberculosis association, or other civic body.

The Boston Association for the Relief and Control of Tuberculosis has given aid by advertising the local dispensary in the motion picture theatres. When the night clinic was opened at the Boston Consumptives' Hospital the motion picture theatres, twenty-five in number, agreed to display on their screens at every performance for a number of days an announcement which our anti-tuberculosis society sent to them calling

attention to the opening of this dispensary. The night clinic has ever since had anywhere from nine to twenty patients in the one evening of each week, when it is open. The coöperation of the labor unions has furthermore been secured through a letter announcing the opening of the clinic. Ministers, also, if interested, will be able to call it to the attention of needy families, and there are undoubtedly other methods of bringing the dispensary before the public.

A most valuable feature of the dispensary, it seems to me, is its ability to discover the early stage cases, thus greatly increasing the chances of recovery for the patients. With the exception of the doctor, the most important part of the dispensary is the nurse, who, in her visits among families, is often able to induce others to go to the dispensary for examination, and thus secure advice and treatment in the early stages. A dispensary, rightly managed, has a distinct educational value.

Now that we have this efficient dispensary law in full operation, let us all work together and give it an honest and impartial trial to determine whether or not the many experts and public health officials are right in their judgment that the dispensary method of handling tuberculosis and the general health problem, combined with the visiting nurse, is of immense value. I should like also to point out the interesting fact that some of these dispensaries are not only tuberculosis centers, but have gone a step further and become general public health dispensaries. This, for instance, is the case in Beverly, and I understand that there are other larger communities following suit.

Doctor Thompson: I should like to ask Mr. Stone what objection there is to publicity in the smaller communities. He spoke of an objection in the smaller communities.

Mr. Stone: Personally, I don't believe there is any objection, but in talking it over with members of the boards of health in some of the smaller communities I find they feel that where everybody knows everybody else it is well not to give the dispensary too much publicity, for the reason that people often do not like to be seen going to it. I don't believe that this is a very valid reason, although I am not perhaps in a position to judge, as I do not work in the smaller communities.

Dr. Walter G. Phippen: Mr. Chairman, the few things that I want to say about tuberculosis dispensaries come from an experience in building up a dispensary in Salem which came not because we had to have it, but because we saw the need of it and so gradually developed it, and it is of the need of dispensaries that I wish to speak first.

I think when this law requiring cities and towns to have dispensaries was passed there was some doubt in the minds of some towns whether they really needed such a dispensary or not. Now I don't think there is any doubt, because a tuberculosis dispensary is entirely different from any other kind of dispensary. It is different in that every case that is admitted to that dispensary is always on its list. That multiplies thousands of times the number of cases that it has to look after. By that I mean to say that if a case is reported and is found to be tuberculous the dispensary must examine every one of the family of that case. That may mean a dozen or even more examinations, which makes a lot of work for that dispensary right off from simply one reportable case. Then all the cases that are sent back from the state sanatoria must be followed up, and they should be followed up through the local dispensary. So that the number of cases that are actually reported in any given year in any community is no criterion of the amount of work that that dispensary is called upon to do.

When you once have your dispensary, as Mr. Stone has pointed out, that is not sufficient. People won't flock to your dispensary. You have got to feed it. Mr. Stone has pointed out various ways of advertising your dispensary. There are other ways by which the dispensary is fed. If you have a local anti-tuberculosis society in your midst, that provides an automatic method of feeding. They will see that the dispensary has plenty of work to do. Then your physicians. Your physicians sometimes perhaps will be a bit backward about sending cases to you for examination, but be patient. Before very long you will find that they will gladly avail themselves of the privileges that the dispensary offers, because through its instructive nurse any quantity of little details can be attended to much better and much more promptly than by the physician himself. The school

physician and the school nurses will and should send many cases to the dispensary, not cases that are tuberculous, perhaps, but cases that are suspicious, and, as the dispensary is largely a preventive measure, that work is very important. Then your charity organizations should be seen and talked to, and they will also provide many suspicious cases for you to look after. Another source of supply are the friends of patients. It has been a very gratifying thing with us in Salem to find how many friends of patients have come to the dispensary for examination simply because they thought they might have the disease. We have been able to find a considerable number of early cases that way. I have spoken of the hospitals and the state sanatoria. Personal applicants will probably be few, but they will come gradually.

Mr. Stone has said that, next to the doctor the nurse is the most important part of the dispensary. I would amend that and say that the nurse is *the* most important part of the dispensary. I don't think that the doctor counts nearly as much as the nurse. She is able to do a great deal more. Some of the things that we find that she has to do in the ordinary routine of her work are as follows: Investigating the housing conditions and recommending needed changes; interviewing the employer—a very great amount of work to be done there; providing an outfit for the patient if the patient is to go to a sanatorium—they don't know what to buy themselves, someone must show them, and the nurse is the one; providing temporary means of treatment while they are waiting sanatorium treatment, as you all know, it takes quite a while for patients to be admitted to the sanatoria, and the treatment should be begun immediately that they are discovered; providing additional food, such as milk and eggs; obtaining the dependent mothers' pension in certain instances; securing permanent relief for the family; bringing the family to the dispensary for examination; arranging for the treatment of other illnesses found in the course of the examination, such as adenoids, tonsils, etc.— a very important part of the work of a tuberculosis dispensary; obtaining proper orthopedic care for the bone and joint cases, including splints, dressings and other apparatus, which requires no end of detail work; securing employment for incipient and arrested cases. This requires also, of course, the coöperation of the medical director, who should be the final judge of the fitness of the work.

Then the matter of records. I think the records are perhaps the second most important part of the dispensary. Accurate records should be kept of every case that enters your dispensary. I believe very thoroughly that there should be one list, alphabetically arranged, of every case that ever enters the doors of your dispensary. From that list references should be made by number to folders. The folder should contain a card containing the whole history of the patient, social history, medical history, etc., also a card containing the instructive nurse's records and all letters, notices, admittance certificates from the state sanatoria, etc., all filed together in one place, so that if anyone comes at any time and says, "Has Mr. So and So ever been to your dispensary?" you can go immediately to one catalogue and find out whether he has ever been there or not, and that catalogue will tell you what disposition was made of him, whether he was tuberculous, whether he was not tuberculous, and if tuberculous where he went.

I think that a street index is of considerable value. We had a street index in Salem. As you know, a large part of our city was burned last year, and our street index was of immense value in rounding up cases after the fire. About two thirds of our tuberculosis cases were burned out, and the day after the fire by simply taking out the cards of this street index of the houses that were burned, we were able to go through the different detention camps and isolate them in one camp. It was of immense value there, and I can conceive other instances where it would be of great value.

Those to me are the important points about the dispensary. I think that it is very encouraging to feel that every city and town now has a dispensary, and we hope now that they will all make good use of it.

Doctor Pierce: So far, the gentlemen who have spoken on this question have spoken principally of the charity cases. I would like to ask what the opinion is as to how far, in well-to-do cases, the board of health in its dispensary work should go in its care of tuberculosis. For instance, take that class of patients who are not charity patients, who are attended by their own physician. The physician, I think, is very apt to resent the fact that the local board of health

wants to step in and perhaps establish a record and perhaps in some way supervise that case, and yet in order to do a real work it would seem to me that all cases had got at least to be under the supervision of the local board of health and also under the dispensary. How far is it the intention that the local board of health should go in regard to the cases which are not charity cases?

Doctor Phippen: I believe that the physicians should take care of their own cases and the dispensary should not have anything to do with the care of the cases, unless asked to do so, but I believe every case should be reported to the dispensary where it can be put on record. If the local physician wishes the instructive nurse to visit or do anything for the patient, I think the instructive nurse should do so, otherwise I don't think she or the dispensary has any authority.

Doctor Pierce: Mr. Chairman, I don't see why her work would be very effective in a case of this kind. It would seem to me that your work is going to fall shy. It is very possible there are some private patients who say they have their attending physician looking after their case, and perhaps he is called in occasionally, but it might come to your attention that perhaps this family was really dangerous to the community. Are you not supposed to step in and try in some way or other to control the action of that family, even though they are not charity people?

Mr. Jackson: I believe that a doctor, if you took his patient away from him, would not report any more cases. In our city, whenever a doctor reports a case of tuberculosis, we ask the doctor if we will send our nurse there. We believe that the doctor is honest, and if he tells us that everything is being done that could possibly be done, under his supervision, and that the patient is no danger to the rest of the household and that all the care that a patient should have, he or she, whichever it happens to be, is having, we leave that case alone for the time being, with the instruction to the doctor that at any time that he would like to have our nurse go there we will send her. This is Brockton, that one of the doctors spoke about. He said he had seen where there were eight patients at one of our dispensary meetings. Well, there is not any question but he might have seen that. We have good days and bad days, like everybody else. I think Doctor McCann is here, one of our dispensary doctors, and he will say it is a very unusual thing to be down as low as eight, and it must have been a stormy night or something of that kind. We have had as high as thirty-four, and the dispensary today is taking care of ninety-three different patients in the city. We have four nurses; that is, the visiting nurse association does the work for us. They go round from house to house, sending people that they are suspicious of to our dispensaries.

We have three school nurses that are doing the same work, and four school physicians that are doing the same work, outside of the general practitioners in the city. So I believe that we have a line on almost every case that needs any assistance in the city of Brockton, and if he found eight cases one night there were nights when we had as high as thirty-four cases. The dispensary in Brockton has been running since 1909, and we did not need any orders from the State Department of Health, because we realized it was something that was needed long before they gave any such orders. The only thing that ever puzzled us was why a law was allowed to be on the statute book the number of years it was without ever being enforced.

Doctor Thompson: I should like to ask Doctor Phippen how much actual nursing service, like giving baths and that sort of work, the tuberculosis nurse should render. Should she attend to matters of personal hygiene in regard to a tuberculosis patient, give him baths, etc.?

Dr. Phippen: Ours give absolutely none. The board of health maintain a nurse in Salem who does that work, and there are other nurses who do similar things—district nurses. Our instructive nurse does nothing but instruct.

Doctor Morrow: I should like to ask how far the treatment in the dispensaries departs from the purely hygienic. How much is the dispensing of medicine practised in these dispensaries?

Doctor Phippen: I believe that the dispensary should not dispense at all. I think that in a few instances it may be necessary to provide certain things temporarily, but my idea of a dispensary is a preventive measure. Nearly every case has its local doctor. If it has not its local doctor, one of the dispensary staff can go and see that case in its house. But we do not dispense medicines generally.

Doctor Denny: I think the question which Doctor Pierce has brought up, of people who are more well-to-do than the charity case, is a very important one. Boards of health cannot absolutely neglect the people who are too well-to-do to come to the dispensary. I know that last year in Brookline we had some cases where well members of the family had been unnecessarily exposed, and one particular case where a child died as a result. We felt that we were very much to be reproached for our inactivity. I think the nurses in a great many cases can go in and interview the family. They can suggest such things as the examination of the well members, and can also keep in a general way a supervision of the children. I think if we are going to control tuberculosis we have got to go into a great many more homes than we have in the past.

Doctor Voss: It seems to me that it is a fundamental thing. As the local boards of health are charged with the health of the community, the obligation is on the local board of health. Under the law, the local dispensaries, whether they are private or have been established by the community, are subject to the rules and regulations of the local board of health. We cannot take away from the local board of health the power to conserve the public health, whether it is in one family or another, whether it is a rich family or a poor family. That fundamental obligation must remain with the local board of health under any condition.

Doctor Thompson: Doctor Phippen, I think, is quite familiar with the different tuberculosis dispensaries in Massachusetts, and I should like to ask how many of them have a paid staff or paid dispensary physician, and what his opinion is in regard to the physician having a salary or compensation.

Doctor Phippen: I don't think I can answer the question as to how many have a paid staff and how many have not. My opinion is that at present they had better not be paid. I feel there are plenty of men able and willing to volunteer their services, just as they would to an ordinary hospital. I don't know, I can't say for sure, but I think most of them are not paid.

Doctor Thompson: I don't see why, if the dispensary is established by a city, and the city pays the city physician, for instance, it should not pay its dispensary physician. I believe that as a rule one or two physicians should control the dispensary, and they should be paid, and they should be held responsible. You know who is responsible if you have one or two men. Hold them to strict accountability for the service rendered, and pay them a salary for it.

Mr. Stone: Mr. President, in reply to the last gentleman I would like to say that the State Department of Health, in approving dispensaries, has made certain regulations. One of the regulations is that the dispensary must be open at least one day, or part of a day, and one evening; another, that it must have at least one nurse, either giving full time or part time. And a third, that the dispensary must have three rooms, two or three—I think it is three—I am not sure,—

Doctor Thompson: Two.

Mr. Stone: Two, is it? And that these rooms must have outside ventilation. I am not familiar with any regulation in regard to the physician, whether he must be paid or not. I think there is no such regulation, but that this point is left for each community to settle. I believe in some instances the physicians are paid and in others they are not.

Doctor Phippen: The matter of interfering with private physicians in the management of their cases I think will not prove to be a serious one with any of you. It is merely a question of time and the tact of your instructive nurse. If your instructive nurse is a good tactful woman, you won't have any difficulty in having your doctors ask to have the patients go. I don't think there will be any difficulty.

Book Review.

Insects and Disease. *Handbook of Medical Entomology. By W. A. Riley and O. A. Johannsen. Ithaca: The Comstock Publishing Co., 1915. 9+348 pp., 174 ill., 8 vo.*

Under the title "Handbook of Medical Entomology," Professors Riley and Johannsen of Cornell University have produced an interesting volume that contains much more than is indicated by the title. Entomology is the science that deals with insects, but the authors very properly include not only the relations of these animals to human disease, but also the Arachnids, Myriapods, and other Arthropods. Moreover they supply figures and descriptions of the principal parasites of other orders which have insects or other arthropods for their intermediate hosts and may be transmitted by them to man.

Toward the end of the book there is an extensive analytical key for the identification of pathogenic arachnids and insects. This is arranged according to the zoölogical classification, is well illustrated, and should prove very useful.

The rest of the book, the greater part, is arranged with regard to the effects produced in man. After a brief introductory chapter, is one dealing with arthropods that are poisonous. In the discussion of the spiders the interesting fact is brought out that for the most part they are harmless, so far as man is concerned. The third chapter treats of the obligatory parasites including ticks and mites, lice, bugs, mosquitoes and flies, and the fleas. They are considered here only in relation to their direct effects on man. Many of these forms are given full treatment in four important chapters later in the book which treat of arthropods as essential hosts of pathogenic organisms.

One chapter is devoted to insects as intermediate hosts of tape worms and nematodes and three chapters to the transmission of pathogenic protozoa. Of the latter the first deals with mosquitoes in their relation to malaria and yellow fever, the second with Trypanosoma and Babesia and their hosts, and the third with the spirochaetes and their hosts. This last mentioned chapter includes a section on typhus fever and lice, the work of Plotz not having appeared when this book went to press. While accepting the protozoan relationship of the spirochaetes, the authors do not fail to call attention to the differences of opinion on that point. It is interesting to note in this connection how small a part the insects and arachnids play in the transmission of undoubted bacterial diseases. The plague and typhus fever are the only ones in which an insect is concerned otherwise than as a simple carrier, and, if the spirochaetes are protozoa, no arachnid has been shown to be an obligatory host of any bacteria pathogenic to man.

One chapter is devoted to poliomyelitis, pellagra, leprosy, verruga, and cancer. The theory that poliomyelitis is transmitted by the stable fly, *Stomoxys calitrans*, is discussed pro and con, and the explanation of pellagra as of dietary origin is noted.

In a final chapter directions are given for exterminating household insects. An extensive bibliography and an index complete the volume.

The book as a whole impresses one as being thoroughly up-to-date. The authors have brought together a vast amount of information from an immense number of scattered sources. The point of view is largely historical, the treatment is brief, but generally adequate. We regret to note the absence of the name of the discoverer of the transmission of plague from rat to man. There are a number of misprints, which will be corrected in the second edition that is sure to be required. In addition to those on the printed list, we note that on page 21 the sting of the scorpion is spoken of several times as the "bite." On page 224 Texas fever is spoken of as being "hereditarily transferred" to ticks of the second generation. Of course *heredity* in the biological sense has nothing to do with the case. It is a case of infection of eggs within the mother.

Finally it may be noted that the book is of convenient size, well illustrated, and well printed on paper that has a surface pleasing to the eye.

R. P. B.

Health Department Reports and Notes.

REPORTS.

Lancaster, Pennsylvania.

The 1914 report of the health department of Lancaster should be commended for the analysis of its morbidity statistics with which the report begins.

The board of health reports no active epidemic of any of the communicable diseases. The fact that there were 41 cases of typhoid and 121 cases of diphtheria in this city of 47,000, while not representing an extremely high morbidity, is nevertheless capable of improvement.

Deaths are tabulated by causes but no totals are given. This tabulation includes stillbirths. At another point in the book deaths are given by age periods and the total is given here as 678. If stillbirths are included in this total, the true crude death-rate is slightly under 14. If they are not included, it is slightly more than 14. The largest single cause of death in males was pulmonary tuberculosis; in females it was organic heart disease.

The unsatisfactory thing about this department report, as about many such reports, is that it fails to present to the reader at a glance the essential facts that he will be interested in knowing about the health situation in Lancaster. It does not say what the death-rate is. It does not make clear what was the actual number of deaths, exclusive of stillbirths, and it does not give the population. The infant mortality-rate is not given and it does not appear that the department is making any distinct efforts along this line. Lastly, the report fails to show the total appropriation of the health department for the period covered and does not give that always interesting figure—per capita expenditure for public health.

Spokane, Washington.

The health officer of Spokane, in discussing milk in his last annual report, says that the time is ripe for a reconstruction of the city's milk standard. He suggests three grades, all to be under 100,000 in bacterial count, with a passable fourth grade having over 100,000 which is to be regarded as suspicious. This is surely a very excellent standard. Certainly a great many cities would not venture to fix it so high.

The table of causes of deaths, which is presented in very readable form, shows by a glance at its column of totals that there were 1,170 deaths, exclusive of stillbirths. One page is given over to a comparative table of deaths, showing the number of deaths in each month of the year for the years 1907 to 1914, inclusive. The death-rate is shown for each of these years. In 1907 the death-rate was 13.40. It had fallen to 8.62 in 1914.

This report on the whole shows that the department presenting it is a very active one. The cover is more elaborate than used on most of the department reports but is probably justified by its attractiveness and will, no doubt, cause it to be read by more people than otherwise. The motto of the department is printed in gold on the cover: "Health is Wealth in Spokane as Well as Elsewhere."

Newport, Rhode Island.

The 1914 report of the department of health of Newport is small and compact; the tables of statistics are few and the recommendations and discussions are contained in a few brief letters of transmissal.

The health conditions in Newport are fairly good and the department is an efficient one, but its report must be classed with the large proportion of such reports which contain only a collection of dead facts and figures without the interpreting statements and careful and scientific arrangement which is necessary to give these facts and figures a vital, living meaning. It is important that the board of health should trans-

mit to the city council the information that four people died of whooping cough and twenty of tuberculosis during the year 1914. It is equally important that the report of the board should inform the council what death-rate this means and it should make sure that the council is able to appreciate the meaning of the term death-rate and know what rate to be satisfied with. It would in many cases be well to show by comparison the local death-rate with that of other cities having similar conditions to meet.

The attention of the council should be drawn to the per capita expenditure for public health and should be given the information which will enable them to determine whether they are getting their money's worth for the money spent, or if, as is often the case, not enough is being spent to secure any appreciable results this should be demonstrated. Vital statistics are the book-keeping of public health as well as the department accounts. All the books should be made to balance and should be easy to audit.

In the report of the inspector of milk for Newport it is stated that 66 per cent. of the bacterial plates examined exceeded the limit fixed by the board. This report does not say what limit the board has fixed. One wonders if the council knows.

NOTES.

A Good Record in Louisville.—The health officer of Louisville, Ky., in a recent issue of the bulletin of his department, points out with justifiable pride that not a single case of diphtheria or scarlet fever was reported during the month of July. The completeness of morbidity reports in Louisville is understood to be comparatively of a very excellent standard.

A month like this, even with some allowance for missed and unrecognized cases, is almost a unique record for a city the size of Louisville.

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Sanitation in Privies.—It is interesting to note with what perseverance the department of health of Virginia continues to devote space in its bulletins to the campaign for more sanitary privies. The June number of this bulletin was entitled "The Danger Zone on the Farm." There was a foreword calling attention to the danger from careless disposal of human excrement, and the rest of the twelve pages was given over to drawings and illustration of various forms of sanitary privies, together with directions for their construction. In addition to these there have been special bulletins describing the construction of particular kinds of privies. For example, the special bulletin issued under date of August 15 is entitled "The Pit Privy." The bulletin points out that the pit privy, if properly screened and covered, will, if regularly used by all the members of the household, prevent hookworm disease and all typhoid carried by flies. It is stated, however, that there are the following limitations upon the use of this type of privy:

"(1) The pit privy must never be located on a grade above or close to a well or spring; (2) the pit privy must not be placed above a limestone ledge; (3) the pit privy must be protected from rain-water, so that the contents of the privy will be kept reasonably dry and thereby will not seep into the surrounding ground; (4) the pit privy must not remain on the same site for more than two years at the very longest, as the earth around it will sooner or later become saturated with the filth."

*

Phases in the Development of Public Health Work.—The following is quoted from a recent issue of the *Bulletin of the Chicago School of Sanitary Instruction* of the Chicago Health Department:

"The development of public health work has passed through three phases. The original conception controlling public health activities called for such protection of public water supplies and disposition of wastes as the crude ideas of science of the times dictated. This stage persisted from ancient times till bacteriology became a science.

"With the discovery of the bacterial cause of many of the infections, public health in common with the private practice of medicine took cognizance of the newer developments and the horizon of its outlook rapidly broadened. From being a mere abater of gross nuisances the health

officer's duties became more and more exacting. With the rapid development of medical and engineering knowledge, the public demand that water supplies be safe at all times, that contagion be reduced to a minimum, that infants be guaranteed safe conduct to maturity—all these and many other demands—have occupied the attention of the health officer. Under this conception of duty the average age of civilized men everywhere has been lengthened. But as the death-rates from contagion diminished, the deaths from pneumonia, cancer and the so-called degenerative diseases—arterio-sclerosis, heart disease and nephritis—increased.

"There is an insistent demand, therefore, that health officers undertake a campaign of education to delay to as late an age period as possible, the incidence of the latter diseases. So far as known, these diseases are intimately related to the life habits of their victims, who can only hope to escape until a 'ripe old age' by an habitual observance o' the rules of personal hygiene."

This is followed by an endorsement of the Life Extension Institute's plan of periodic physical examination and by a table of statistics of chronic nephritis death-rates.

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Treatment of Bee Stings.—Almost every department bulletin prints something every summer or every month during the summer about mosquitoes and flies, but it is rather unusual to find anything about bee stings. The July bulletin of the Bureau of Health of Rochester, N. Y., contains the following interesting paragraphs regarding bee and wasp stings:

Bee Stings—Wasp Stings.

"Excepting an attack of poison ivy or a severe sunburn, nothing is so momentarily painful as a bee sting in a susceptible subject. Experimentally, we know that a minute drop of the poison exuded by a bee through its sting will produce the most exquisite local pain and general bodily discomfort in a susceptible individual. Some persons, even bee experts, are more highly susceptible to stings than others. It may be of interest to know that susceptible persons may be protected from bee stings by the use of a vaccine made from the material extracted from the honey bee. It may also be interesting to know that bees or wasps will more readily attack persons dressed in dark clothing than those dressed in light clothes, and that if one is dressed in light clothing with a dark hat or band, bees will more readily sting through the colored part of the clothing than through that which is light.

"When a person is stung by a bee, the sting is pulled away from the abdomen of the bee and enters the skin of the individual stung. Just as soon as the sting is inflicted the person usually rubs or scratches the place that is stung, and in this way causes the sting to penetrate deeper into the flesh and the poison in the sting is further exuded by the rubbing or scratching of the fingers against the stung part. *Do not rub a bee sting.* If your eyesight is not good enough, get a magnifying glass and take a knife or fine needle and try to get the bee sting out of the skin. You can see it as a flesh-colored, irregular, needle-shaped body lying in the skin at the point where the sting was inflicted. Then touch the sting with weak ammonia or spirits of camphor, or with ordinary tincture of iodine, or with a mixture of tincture of iodine, 2 drams to 10 drops of carbolic acid.

"A hornet sting may be removed in the same way as the bee sting and then washed out with alcohol, because the poison of the hornet sting is soluble in alcohol.

"If none of these substances are to be obtained the sting may be touched with moist soap, so that a film of soap will be left over the sting. This will relieve pain. But first and most important—remove the sting with a knife or needle."

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The Physician and the Public Health.—It is an old story that the health department of a community cannot be of the greatest benefit to the public it serves without the coöperation of the local physicians, but it is a story which deserves retelling, both to the physicians who may be slow to lend this coöperation as much as they should, and to the health officers, who may for the moment lose sight of the importance of having the good will of the practising physicians and through their own fault lose some of this help.

The bulletin of the Connecticut State Board of Health quotes, from an article by Dr. J. W. Trask of the United States Public Health Service, a few remarks on this subject which deserve reproduction here for the benefit of those who may not have seen them:

"To control disease the health department must know when disease exists, where it exists, and under what conditions it exists. This knowledge can be obtained only through the reports of the notifiable diseases made by physicians; the practising physician is therefore an essential part of the health department. This is true whether the physician recognizes it or not, and whether the community recognizes it or not. The physician is the outpost, the picket that must give to the health department information of the approach of the enemy, his numerical strength, and his armament.

"Coöperating with an efficient health officer, the physicians of a community have it within their power to make the efforts of the health department successful or to make their success impossible. The practising physician who fails to report a case of communicable disease thereby endangers the welfare of the community and exposes others to the danger of contracting the disease. He is neither a good physician or a good citizen and must be considered as opposed to the principle of the control of disease and the protection of the people for which the health department stands.

"With the help and coöperation of the practising physician the health department can do much to prove the truth of Pasteur's statement that it is within the power of man to cause all infectious diseases to disappear. Without the coöperation of the practising physician the health department can do but little."

Public Health Notes.

Why Babies Die.—The following short discussion of infant mortality from diarrhea appears in the *Medical Officer*, London, under the title given to this note:

"Diarrhea was the cause of twenty-four deaths in the borough of Batley during 1914, and Dr. G. H. Pearce, M. O. H., states that so far as the deaths of children are concerned—nineteen out of the twenty-four—practically every one of these fatalities should never have occurred had the simple directions been carried out which are continually being given to mothers of infants both by printed pamphlets and by personal advice through the medium of the health visitor. The average yearly number of lives wasted in Batley through this disease since 1890 has been thirty-eight, and for the whole of that period 968 lives have been uselessly sacrificed to the prevalence of what is known as one of the filth diseases. Zymotic enteritis is usually confined to the months of July, August and September, but it was remarkable that in 1914 the first death occurred on June 9 and the last on December 8. There were deaths in each of the intervening months, eleven of them taking place in September alone. The amount of diarrhea in any town is usually looked upon as an index of its sanitary condition. In Batley, owing to measures having been taken by the corporation during the last few years, the sanitary conditions have been considerably improved, and had the mothers of infants improved their methods accordingly there is no doubt the annual death roll of this complaint would be much less. Dirty women, dirty houses, long tube bottles, food left about the whole day on the table, together with its pollution by flies, cats and dogs, is a common cause of the disease. Dr. Pearce states that these conditions are found in many of the houses of the town. Bottle-fed children, as is well known, are particularly susceptible, and it is quite the usual thing to go into homes where the milk for the baby, after standing exposed to pollution by dust and flies for hours, is then put into a dirty long tube bottle, frequently sour, and given to the child. As Doctor Pearce says, it is remarkable when all the circumstances are considered that many more infants do not die than is actually the case. Of the nineteen fatal cases among children, seventeen were fed on the bottle and only two on the breast. In each of these latter cases the home conditions were far from desirable.

"The health visitor all the year round instructs mothers how to feed and bring up their infants, and from May to October distributed leaflets on the fly danger and the risk of diarrhea, to young children. A great improvement is said to have been the result, but evidently there is much to be done yet. Efforts are made

to enforce compliance with that portion of the nuisance by-laws of the borough which requires all manure to be removed at least once every seven days. Doctor Pearce says, truly enough, that it is a simple matter to remove manure once each week, but it is remarkably hard to get owners of animals to banish their old fashioned ideas, particularly if it means a little extra trouble."

A Protective Therapy for Mumps.—It is evident from recent medical practice that the blood of one individual may be employed as a therapeutic agent for another without danger, and advantages are thus secured sometimes which could be obtained in no other way. Such a practice was resorted to at the Hebrew Infant Asylum of New York recently in an attempt to control an epidemic of mumps. Care was taken in selecting the donor of the vital fluid. Whole blood was used and was injected intramuscularly. The blood was aspirated in the usual way and immediately injected into the patient so that there was no need of adding any anticoagulant.

Various tables show the results of this treatment. Of the seventeen children inoculated, all of whom were exposed to the disease, none became ill. In wards where the children were not so protected one-third or even one-half came down with the disease. The authors believe this treatment to have been effectual in checking the epidemic and assert that it is a practical preventive measure which may be resorted to in the home. Experience seems to indicate that the blood may, with advantage, be obtained from the donor even before the parotid swelling has disappeared. The long incubation period of mumps allows the use of a protective injection some days following exposure. The duration of the acquired immunity probably outlasts the danger period of infection.—Alfred F. Hess, M. D., *American Journal Diseases of Children*, August, 1915.

Risks from Tuberculosis Infection Retained in Books.—The following is a summary of an article by Henry Kenwood and Emily L. Dove in the *Lancet* of July 10:

Experiments were undertaken to test the possibility of transmitting living tubercle bacilli in an infective form by means of books used by tuberculous patients. Patients were allowed to cough upon sheets of paper and these were then washed and the washings injected into guinea-pigs. An interval of twenty-four hours elapsed between the contamination and wash of the papers. Tuberculosis was produced in pigs from eight of the pieces of paper, while six papers caused no infections. The test was repeated with papers kept one month after their contamination; guinea-pigs inoculated from these papers manifested nothing. Similar tests were made with thumb marked pages from books from the public library which had been recently used by tuberculous patients; no infections resulted. Sheets of paper were then thumb smeared with diluted tuberculous sputum and six of these were washed twenty-four hours later and the washings injected into as many guinea-pigs. Of these one died of sepsis, four manifested tuberculosis, and one was uninfected. Six other sheets similarly treated were kept for a month, and of these only one produced tuberculosis in guinea-pigs. Further, it was found that the exposure of such contaminated sheets to moist heat at 95° C. for half an hour served to kill all the tubercle bacilli. The same result was secured with pieces of contaminated handkerchief immersed for fifteen minutes in water which had been brought to the boil and which was then removed from the flame. From these results the authors conclude that the danger of transmitting tuberculosis through the use of books by infected persons is very slight and can be practically removed by the temporary withdrawal of such books from circulation. Moist heat is a simple means of completely destroying tubercle bacilli on books which would not be hurt by an exposure for fifteen minutes.—*New York Medical Journal*, July 31, 1915.

A New Fixing and Hot Staining Apparatus.—The need of a clean and neat apparatus for hot staining with carbolfuchsin has apparently been met by a device which the *Journal of the American Medical Association*, July 31, 1915, describes as follows:

"The apparatus (a description of the twenty-slide type used by us is given), which can be made to accommodate any number of slides, multiples of two up to about twenty, consists of a large asbestos wood frame with base which will withstand a red heat without destruction.

In the bottom of the box-like frame is contained a sliding metal shelf to be filled with sand for catching any carbolfuchsin drippings and to aid in reflecting all the heat upward from the heating units, of which there are ten (one for every two slides). These units, which are easily replaceable, are simply made of 'lavite' wound with nichrome wire (size 32), which will give the proper heat when connected with a 110-volt lighting circuit. (The nichrome wire used was tested for solubility in boiling carbolfuchsin solution and found to be insoluble.) In order to regulate this current more accurately, however, there is included in the circuit a small suitable rheostat. For the purpose of leveling the apparatus so that it may stand on any laboratory table, the two front legs of the base are made of adjustable leveling screws. The slide carriers are nickel plated brass frames made to fit in the asbestos frame at a suitable height above the electrical units, and with a handle at each end for moving it about, and suitable grooves so that the slides can be removed with forceps. When large numbers of slides are to be stained, three of these slide carriers are used, being placed in small trays made for the purpose. In this way it is possible to do continuous work as, for instance, fixing and staining one set while decolorizing, etc., the other sets. The trays can also be conveniently used in decolorizing and contrast staining by merely carrying to a nearby sink suitably arranged. A set of fuses is arranged on the apparatus so that there is no danger of accidental short circuit and burning of the operator. The apparatus is fireproof, being made entirely of metal and asbestos wood, as approved by the National Board of Fire Underwriters. This apparatus has been found to be a tremendous time saver by all who have used it in our laboratories.

"The apparatus can be obtained complete (sizes two to twenty slides) from A. de Khotinsky, 6026 Drexel Avenue, Chicago."

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The Destruction of Fly Larva in Horse Manure.—Bulletin No. 245, of the United States Department of Agriculture, July 20, sets forth recent advances along this line. It had already been known that borax was an effective larvicide and could be used at a cost of 0.42 cents per bushel. This treatment, however, rendered the manure of slight value for fertilizing purposes. Recent experiments have shown that powdered hellebore (from Veratrum album and Veratrum viride) is an efficient larvicide and free from a deleterious action on the fertilizing value of the manure. The cost of treatment, which calls for one-half pound of powdered hellebore to ten gallons of water applied to eight bushels of manure is 0.69 cents per bushel.—*Journal American Medical Association*, July 31, 1915.

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Vaccine in Whooping Cough.—As the result of an extensive investigation of the prophylaxis and treatment of whooping cough carried on by the Research Laboratory of the Department of Health of the city of New York, Luttinger draws the following conclusions: (1) Pertussis stock vaccines as prepared by the Bureau of Laboratories seem to have a prophylactic value when given in high doses. (2) In the treatment of pertussis, these vaccines seem to have shortened the duration and severity of the paroxysmal stage; the average duration of the whoop being twenty-five days, compared to forty days of those treated with drugs. (3) Further experiments with the view of obtaining more effective vaccines and a closer coöperation of the profession in public health education may help in the eradication of pertussis, this scourge of childhood which kills yearly ten thousand American children. In view of these results, the Bureau of Laboratories seeks the collaboration of private practitioners in more extensive tests of these vaccines. The necessary quantity accompanied by direction for administration and a history card will be given to any city practitioner who promises to report the results obtained. In doubtful cases the sputum may be sent to the research laboratory for diagnosis. To be of any value, the sputum must be obtained early in the disease from the bronchus. The characteristic sputum is obtained by inducing a paroxysm by tickling the child's fauces with a wooden tongue depressor, and appears as a grayish white tenacious plug of mucus.—*New York Medical Journal*, July 31, 1915.

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An Important Ruling on the Harrison Law.—"Since the Harrison law went into force, frequent inquiries have been made," says the *Journal of the American Medical Association* "as to the quantity of drugs which a physician was justified in prescribing or dispensing. Obviously,

the quantity necessary in chronic cases or in the treatment of drug habitués differs materially from the quantity permissible in an ordinary case. The law makes no provision on this point, except to provide in general terms that, whether prescribing or dispensing, all acts coming under the scope of the law must be in good faith and not to evade the purposes of the act. It has been evident that some supplementary ruling on this point would be necessary. The Commissioner of Internal Revenue has just issued a ruling, dated May 11, which provides that 'where a physician, dentist, or veterinarian prescribes any of the aforesaid drugs (those included in the provisions of the Harrison law) in a quantity more than is apparently necessary to meet the immediate needs of a patient in the ordinary case, or where it is for the treatment of an addict or habitué to effect a cure, or for a patient suffering from an incurable or chronic disease, such physician, dentist, or veterinary surgeon should indicate on the prescription the purpose for which the unusual quantity of the drug so prescribed is to be used. In cases of treatment of addicts, these prescriptions should show the good faith of the physician in the legitimate practice of his profession by a decreasing dosage or reduction of the quantity prescribed from time to time, while on the other hand in cases of chronic or incurable diseases, such prescriptions might show an ascending dosage or increased quantity. Registered dealers filling such prescriptions should assure themselves that the drugs are prescribed in good faith for the purpose indicated thereon and if there is reason to suspect that the prescriptions are written for the purpose of evading the intentions of the law, such dealers should refuse to fill same.' Under this ruling, physicians must place on their prescriptions, whenever, for any reason, an unusual quantity of opium or cocaine is prescribed, a statement of the reasons for such an order. If the physician and patient are acting in good faith, it is difficult to see any objection to such a provision. There will, of course, be some sensitiveness on the part of secret drug addicts to having their weaknesses made a matter of record, but this can hardly be avoided in any plan which will separate the genuine from the spurious demand for these drugs. The ruling of the commissioner will clear up a point on which there has been much discussion. As the *Journal* has constantly stated, the object of the Harrison law is to secure publicity in the use of habit forming drugs and to effect the prosecution and punishment of all persons using them for illegitimate purposes. Compliance with this ruling will relieve physicians of responsibility and will make the prescribing or dispensing of unusual amounts of these drugs a matter of record."

Second-Hand Clothing and Communicable Disease.—The August number of *Public Health*, London, contains an article on the relation of second-hand clothing to the spread of infectious disease.

It is pointed out that there are four branches of the second-hand clothing trade:

1. Pawn shops.
2. Second-hand clothes shops.
3. Rags and bone dealers.
4. Buyers of second-hand clothing at private houses.

The author states that parents often take advantage of the fact that a child is ill to pawn some of the garments, quite regardless as to whether the child is suffering from an infectious disease.

The author makes the following interesting statements:

"One of the first cases brought to my notice was that in which a man had sent his daughter to pawn the skirt and some of the bed-clothes from the bed of his wife, who was lying ill with what ultimately proved to be enteric fever. This woman died, her daughter developed the disease and recovered, but the pawnbroker's assistant who took in the clothing contracted enteric fever and died from the effects of it.

"This was a case of undoubted direct infection from the woman to the assistant, but the husband could not be dealt with, as he had at the time no knowledge of the complaint from which his wife was suffering.

"Infection from scarlet fever, measles, whooping cough, etc., is much harder to trace, as it is difficult to induce parents to admit dealings with pawnshops." . . .

"Twice in one week a pawnbroker in one of the districts sent word to the health department that he had refused to take in bundles from certain families, as he had heard that there was 'fever' in the house.

"On making inquiries in both cases, infection was found to be present in the child whose clothing had been sent, and in both cases this was the first intimation the department had had of it. Now, this goes to show two things: first, that the pawnbrokers are careful, and do what they can to coöperate with the health department; but it also shows that there is a risk of the spread of disease in this way.

"Quite recently two cases have occurred in which it was found by our inspectors that clothing and boots had been pawned after a child had been taken ill with scarlet fever, and before the parent had become aware of the nature of the complaint."

In his conclusion the author makes the following statement regarding the remedy for this situation.

"All such business as those of second-hand clothes dealers and rag-gatherers should be licensed in every town, and certain conditions regulating these trades should be laid down."

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Method of Destroying Lice and Body Vermin.—A British medical journal, June 19, publishes an article of Kinloch dealing with the above topic.

"For practical purposes, Kinloch states, the destruction of lice and nits is best secured by immersion of verminous garments and bed clothes in a petrol or benzene bath. Danger from fire and waste of petrol are avoided by using such a bath and extractor as are employed in a dry-cleaning apparatus. In such an apparatus 90 per cent. of the petrol or benzene is recovered for future use. A petrol or benzene bath is necessary, especially for uniforms and woolen garments generally. In cases in which the clothing is such that it is not injured by immersion in water, steeping the garments for half an hour at 12 C. (54 F.) in a soap solution containing 2 per cent. of trichlorethylen or 10 per cent. of tetrachlorethan secures destruction of lice and nits. For cleansing the body itself, bathing or sponging with soap solutions containing 2 per cent. of trichlorethylen or 10 per cent. tetrachlorethan gives the best results."—*Journal American Medical Association*, July 17, 1915.

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How Not to Economize.—The *Medical Officer*, London, for July 31, devotes a column to the discussion of this topic. The article refers to the withdrawal of the vote of £25,000 for research in connection with the prevention, diagnosis and treatment of disease, stating that Mr. Montague, secretary to the Treasury, pleaded in vain for the scheme but that the members of the House of Commons ignored his warning that it was necessary for the public health. The writer of this article continues as follows:

"The whole subject of retrenchment will have to be very carefully considered if trouble is to be avoided when our fighting men return from the war. Those who have risked their lives and bled for England will have a wider outlook than formerly when they return to civil life. We hope and believe that they will be less satisfied to live in squalid surroundings, and that they will demand sanitary housing where they can rear healthy families in decent surroundings. Whatever economies are necessary after the war, we doubt if our local authorities will be safely able to reduce an expenditure on housing and sanitation which has never been excessive. They must find other ways of saving if they expect to see a contented people in the difficult days ahead of us. For our part we are prepared to argue that, following on the loss of so many of the flower of our race, it would be the truest economy to spend freely on maternity and infant welfare schemes, on the medical treatment of school children, on the sanitary housing of the working classes and on the prevention of disease. Let us by all means practise rigid economy in the matter of luxuries, but let there be no stinting of expenditure essential to the health and the well-being of our people."

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The Detection of B. Coli.—Mr. George W. Fuller, chairman of the Engineering Section of the American Public Health Association, in an address presented before the Mechanical and Engineering Section of the Franklin Institute of Pennsylvania last November, pointed out that the bile presumptive test for B. coli, while markedly helpful in all cases, may in some instances lead to a certain amount of injustice against very important water supplies. In his argument Mr. Fuller quotes the following from an article in the *Journal of Infectious Diseases* for 1911:

"B. coli is found in sewage, and therefore its presence is significant; but, as newspaper re-

porters and other persons are inclined to magnify conditions, the officers in charge of purification works should be careful to identify suspicious organisms as true B. coli before throwing suspicion upon their plants and prejudicing the minds of the people."

Mr. Fuller in closing this section of his paper says:

"It seems important to have the standard methods of bacterial water analysis thoroughly reviewed and brought to date. And it is understood that the American Public Health Association, through its Laboratory Section, appointed a new committee to deal with this subject (Jacksonville [Fla.] Convention, December, 1914.)"

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The Prevention of Syphilis.— The *New York Medical Journal*, July 17, 1915, contains an article by Dr. A. W. Stillians dealing with the above topic. He cites statistics showing that from 6 to 15 per cent. of the population of various countries are syphilitic. Life insurance statistics and also hospital records credit syphilis with from 7.5 to 18 per cent. of all deaths. Its death-rate, according to White, is greater than that of any other disease except possibly malaria. And yet the fact that the amount of this disease in the United States army has recently been reduced by one-half gives encouragement for a campaign against it. The work in the army has consisted of the education of the troops by lectures and literature and by the adoption of stringent measures for those soldiers who contract the disease and allow it to go untreated. The author believes that a similar campaign should be carried on among civilians. His conclusions in part are as follows: "Among legislative measures needed, an act making it a crime knowingly to transmit venereal disease and an act requiring a certificate of health before marriage are important. Prevention by means of the Metchnikoff ointment should be advocated for all those who expose themselves to the danger of contamination."

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Every Nurse a Public Health Nurse.—The *Nurse* for August contains the following editorial:

"Next to the physicians, those members of a community most familiar with disease are the nurses. Their theoretical training includes considerable study of the causes of disease, and their experiences with the unfortunate victims of infection or epidemic cannot fail to emphasize the importance of the relation between cleanliness and health in the community. The nurse's knowledge, moreover, gives her a position of authority in public health work. Her opinions, founded on experience, carry considerable weight with the average citizen. And in no better way can she assist in public health work than by teaching cleanliness, both by precept and example.

"Cleanliness is the most emphasized word in the hospital and training school. The nurse has material in plenty, therefore, for a series of lectures on the importance of keeping the community clean. Most of the summer diseases, typhoid for example, are the result of filth and unhygienic conditions. Every householder who fails to keep his premises clean is a menace to the community. If he allows rubbish to accumulate or neglects the drainage on his property or keeps a dirty stable, the act constitutes a nuisance under most of the health codes, and the matter should be brought to the attention of the health authorities, for it is a source of disease. Some other sources of disease which health boards are striving to eradicate are impure milk, dirty streets, negligent handling and disposition of garbage, unscreened accumulations of stable refuse, and pollution of streams and other sources of water supply. Every public-spirited nurse will do well to consider herself a self-appointed public health nurse to the extent of coöperating with the health board by bringing to light wherever possible the unclean places which menace the health and are conducive to an increased death-rate in her community."

It will be noted that this editorial urges the nurse to coöperate with the health authorities by bringing to light unclean *places* which menace health. It is worth noting in this connection that the nurse, whether she be by vocation a public health nurse or whether she be serving private patients, is more likely to find uncleanliness in patients than she is in places. We all see dirty places which it might be argued we could "do something about." The nurse does work which reveals personal uncleanliness and neglect of hygienic routine. Is it not possible that by the proper use of tact and argument

she could discharge her patients with a better knowledge of the essentials of personal hygiene and a greater interest in observing them?

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Heredity in Relation to Cancer.—The *Interstate Medical Journal*, July, 1915, publishes an article by Maud Slye setting forth the result of extended study upon the inheritance of cancer among mice at the Cancer Laboratory in Chicago. She has noted that the rapidity of tumor growth varies with that of the growth processes of the individual. The conclusions from this important study follow:

"The clinical behavior of cancers in this laboratory is opposed to the theory of infection.

"1. Infection takes the weak individuals. Cancer selects the strong ones.

"2. Reduction of feeding and consequent lowering of resistance increases liability to infections; it lowers the cancer frequency.

"3. Vigorous growth processes are necessary for tumor growth. They militate against infections.

"4. A very slight infection will kill a pregnant female. Tumor growth is retarded by pregnancy.

"5. The results of these experiments show cancer to be hereditary in the strict sense. The infections common among my mice are no more liable to occur in one family than in any other if the individuals are separated from one another; whereas cancer crops out no matter where the mice are kept.

"6. The infections common in this laboratory spread not only through the cage, but to adjoining cages. The most careful and long continued experiments have failed to show a single case of transmission of cancer by contact in the same cage or in adjoining cages.

"7. If an infected mouse dies in a cage and is partly eaten before it is removed, every mouse in the cage is liable to be swept off by the same infection. Over and over again, the cancers of mice have been eaten by their mates or by mice placed with them as controls. I have never had a case of cancer in such controls. Portions of the cancer and of the viscera of dead cancerous mice have been systematically fed to mice in control cages without a case of cancer in such controls.

"8. Cancer is a disease of middle and advanced age when the normal growth processes are confined to regeneration and reproduction. Infections are diseases of early life, when growth processes are largely accretions in quantity and in complexity.

"Whether or not cancer shall prove to be an infection, it has one profound difference from any infection known to man. It follows the laws of heredity with an inevitableness which makes it a character that can be manipulated. It can be bred into and out of strains at will. It can be put into a strain where it has never existed and it can be drawn out in extracted lines which can produce nothing else; or it can be bred out of a line one side of which originally carried 100 per cent. of cancer.

"Cancer is not transmitted as such, but rather as a tendency to occur from a given provocation, probably in the form of over irritation. The elimination as far as possible of the causes of over-irritation to the tissues of all individuals of high cancer ancestry should go far to eliminate the provocation of cancer; and the eugenic control of matings so that cancer shall at least not be potential in both sides of the hybrid cross ought to eventuate in a considerable decrease in the frequency of human cancer."

❦

Pasteurization of Milk.—"Although the pasteurization of milk has become a familiar process in various parts of the United States and is highly lauded in many quarters as an admirable safeguard of the health of consumers," says the *Journal of the American Medical Association*, "there still is considerable misconception regarding the results actually accomplished. The real function of pasteurization, that is, its actual effect on the milk involved, is not understood so adequately or accurately as it ought to be. Those least conversant with the underlying facts often believe that the procedure destroys all the microörganisms present in raw milk; the results attained are confused with what is attempted in complete sterilization of milk by more vigorous methods. The more rational assumption, on which the current practices in general are based, is that pasteurization of milk, by heating it to a temperature of from 60° to 63° C. (140° to 145.4° F.) and holding it at this temperature for from twenty to thirty minutes, serves to destroy any bacteria of diseases regarded as transmissible by milk. The use of higher temperatures for shorter

periods is now more generally avoided because it is believed that undesirable chemical changes are more likely to take place in milk treated in this way, and more especially because higher heating destroys an undue proportion of lactic acid bacteria, while the spores of certain micro-organisms which decompose the proteins of milk are not destroyed. As a result, the milk may subsequently become unwholesome from putrefactive change before it becomes sour as a result of the acid-forming bacteria.

"Realizing, then, that pasteurization is never expected to destroy all bacteria in milk, one is prompted to ask what margin of safety against survival of undesirable living organisms remains at the temperatures and during the periods currently advised for heating the milk. It is said that the presence of colon bacilli in pasteurized milk is generally interpreted as meaning either that the milk was not properly heated or that it was reinfected after pasteurization by careless handling. This interpretation is based on the low thermal death point of cultures of B. coli. In the laboratories of the Dairy Division of the Bureau of Animal Industry at Washington, Ayers and Johnson have ascertained the thermal death point of many cultures of colon bacilli isolated from numerous typical sources of contamination, such as the excrement of man and cattle, flies, milk, cream and cheese.

"It is important from a practical standpoint to learn that 62.8°C. maintained for half an hour is a critical temperature for most colon bacilli. It seems desirable, however, to emphasize the fact that though there is a low 'majority thermal death point,' a few cells often may survive this. Under the circumstances pointed out, the thermometer needs careful watching, and the pasteurization process calls for intelligent execution in order to produce dependable results. The presence of a large number of colon bacilli immediately after the heating process may indicate improper treatment of the milk.

"The government bacteriologists have reached the conclusion that if milk is pasteurized at a temperature of 65.6°C. (150°F.) or above for thirty minutes, they would not expect, from their results, that any colon bacilli would survive. Consequently, under such conditions the colon test for the efficiency of pasteurization may be of value. It must be remembered, however, that a study of more cultures may reveal strains of colon bacilli that are able to survive this and even higher temperatures."

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A Law with Teeth.—The following is an editorial referring to the Harrison anti-narcotic-drug law which appeared in the *Boston Herald*:

"Plainly there are teeth in the Harrison law which went into effect nearly six months ago as an attempt to check the drug evil. The difficulties that this federal law have put in the way of drug victims, when they attempt to get the narcotics that their diseased systems crave, are indicated in the rush of the victims to the various homes and sanatoriums that hold out a promise of a cure. The superintendent of one such reputable institution, here in New England, says that in the last six months he has been overwhelmed by applications and has had to turn away hundreds that he had no accommodations for.

"As long as the drug fiends could get their regular supply of 'dope' they drifted along contentedly enough toward their miserable fate. When the supply was cut off, they frantically sought a cure from the mad craving that they could not satisfy. Some cases yield to treatment—many do if taken early enough—but many are beyond cure. An unusually large crop of suicides shows the refuge that the uncured and uncurable seek in their agonized desperation. In many cities the police and the hospital heads have this same story to tell. The tragedy of the pitiable creatures who are the immediate victims of the new law may well stir any heart to pity, but the welfare of society demands that the sale of the narcotic drugs be far more closely supervised and regulated than in the past.

"When medical men say that five times the quantity required for the legitimate trade, not to mention the quantity smuggled, has been imported in recent years, we get some conception of the growth of the evil that has so many thousands, probably hundreds of thousands, in its grip. The country districts have their victims, as well as the city slums. Every community knows them—sad wrecks of what might have been men and women. The hardships brought them by the new law, which effectively supplements the widely varying state laws, cannot be weighed against the greater need to fight a menace that has become worse here than anywhere else in the world, except in China itself."

Industrial Hygiene and Sanitation.

Hygiene Pointers for Workers.—Dr. W. Gilman Thompson has contributed a valuable article to the July issue of the *Dodge Idea*, entitled "Hygiene for the Workman as a Doctor Sees It." In this article a number of topics are treated briefly but with proper emphasis on the important points. There are instructions which are applicable to the personal hygiene of any one and, on the other hand, there are special directions for those whose work subjects them to special conditions and special risks. The following paragraph is for the benefit of those who work in dusty atmospheres:

"All workers in dusty atmospheres should frequently cleanse the mouth and nose. For the mouth and throat, a wash and gargle of either common salt or boric acid solution should be used, in strength of about half a teaspoonful to the cup of water. For the nose a warm salt solution of the same strength may be used by inhaling a little of the fluid poured into the palm of the clean hand, or poured with a spoon into the nostrils and blown gently out again. In the nostrils the dust will thus be prevented from encrusting with the mucus and causing ulceration and chronic catarrh."

This paragraph, while it emphasizes the necessity of properly fitted shoes for those who are obliged to stand for a long while at a time, is nevertheless a point which might well find a place in the bulletin of state or city department of health or in a school physiology:

"It is distinctly worth while for workmen to keep the feet in good condition, for this does much to prevent fatigue in those who have to stand through long hours. Ill-fitting shoes, which tend to produce flat-foot, blisters, bunions, etc., greatly impair efficiency, and by pain or discomfort which they cause give rise to secondary troubles of various sorts. Female employes especially, who stand all day as in tending looms or other machines, should keep an extra pair of easy shoes to work in, changing them for street shoes on going home. Stockings with holes or hard seams should not be worn."

On the first page of this article there is the following extract from Doctor Thompson's book on "Occupational Diseases," printed in larger type than the principal text and placed in the middle of the page:

"'Exercise for health rather than for strength.' That in a nutshell may be said to be a precept of some of our large industries. By mottoes distributed throughout the factory, by books, by leaflets, by movies, by health talks and in innumerable other ways the need of systematic bodily exercises is being impressed on workers, both in office and in shop. Emphasis is probably laid more on the gentler exercises, such as in calisthenics one takes on arising in the morning, than on games. But games are encouraged in every possible way, because they are a means of furnishing fresh air, exercise, and outdoor life. The good results from every viewpoint are apparent. Fewer are sick; all are more efficient."

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Healing of Wounds.—This note is taken from *For You*, the excellent welfare bulletin of the Ford Motor Company:

"Wounds heal very fast if they are clean. Clean means without dirt,-and also clean of germs.

"Germs are often on the skin and on the tool or whatever causes the wound. When they are not cleaned out of the wound at once, blood-poisoning may result.

"The best way to prevent blood-poisoning is to clean the wound at once. Then keep it clean by covering with a clean piece of linen which has been boiled, or a piece of sterile gauze, and hold firmly in place with a bandage.

"To clean a wound, wash with gasoline, taking plenty of time and using a piece of clean linen to wash with. Clean the skin all around the wound and wash into the wound. Then paint the wound and the surrounding skin with tincture of iodine. Iodine kills the germs at once.

"If there is no gasoline or iodine handy, wash the wound thoroughly with alcohol and put on a piece of clean linen wringing wet with alcohol.

"No cut is so small that you can afford to neglect it."

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Hygiene for Office Workers.—An insurance company is not what is usually suggested when industrial corporations are mentioned. Nevertheless, some of the welfare work done by such corporations, as the Metropolitan Life Insurance Company, comprehends many activities which deserve the consideration of heads of welfare

departments in more essentially industrial plants.

The Metropolitan Company has issued a booklet describing the welfare work which it conducts for the benefit of its employees.

Some of the features of this work are:

The Staff Savings Fund, to which the company, in order to encourage employees to contribute to the fund, subscribes 50 per cent. of the employees' deposit—this bonus, however, may not be withdrawn until the employee has been in the service for twenty years:

The Luncheon Service, which provides without cost to the employees a complete lunch daily. The luncheon service is extended to the staffs of the printing, mechanical, and commissary departments, as well as to the clerical force. The period allowed for luncheon is thirty-five minutes.

A Disability Insurance has recently been inaugurated. The company pays one half of the premium for the disability insurance, which provides for benefits of two thirds of the salary for a period of twenty-six weeks, half benefit for 234 succeeding weeks, and quarter benefit thereafter until the insured reaches the age of sixty-five.

Medical Service is fully provided for all. Applicants for positions in the home office are subjected to a careful medical examination. A reëxamination is made annually in order that serious diseases may be discovered in the early stages and proper remedies suggested. For sick employees the company provided in June, 1911, a completely equipped dispensary, consisting of a nurses' office, two service rooms, one rest room for men and one for women, and an isolation room for the treatment of accidents.

The dispensary is open during office hours, *i. e.*, 9 a. m. to 4.30 p. m.; Saturday, 9 a. m. to 1 p. m. The medical directors, their assistants and three graduate nurses are in charge. Treatments include necessary medical and surgical care, physical examination, and instruction in hygiene. Physicians, including a specialist for eye, ear and throat, hold daily clinics. A dental clinic has recently been added and the teeth of employees will be examined semi-annually.

If clerks, however, develop tuberculosis, they are sent to the company's sanatorium at Mt. McGregor. The company's interest in a case does not cease after the clerk is able to return to work. There are now twenty-two ex-patients at work under the supervision of the medical department. These patients are given extra diets daily—morning and afternoon. It is possible, therefore, to observe these arrested cases twice daily. In this way, any change in general appearance or return of temperature may be noted and immediate action taken. Temperature, pulse and weight are recorded bi-weekly.

During the year 1914, 23,098 visits were made to the dispensary by 1,948 patients. Of these 67.3 per cent. were women and 32.7 per cent. were men; 14,573 medical and 8,525 surgical treatments were given. The daily average was 83.75 treatments. Two hundred and eighty-eight patients were referred to hospitals and other institutions for special treatment.

In addition to these more purely health activities the company maintains a social service and a number of educational classes. A gymnasium is provided and there is an annual field day.

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The Care of the Feet.—Soldiers and all workers who are obliged to stand on their feet a great part or all of the working hours cannot take too good care of them. Women workers in particular are prone to complain of tired and aching feet.

It is well recognized from a medical point of view that the care of the feet is a prime essential to a soldier's efficiency. The matter is discussed in the *Spectator* of February 27 last by a gentleman who speaks on the strength of some thirty years of mountain walking and climbing, and who writes under the initials of "W. L." His experience was gained, so he says, under Swiss guides, who served as soldiers once a year. The practice of soaping the feet and socks he condemns. It does not offer much protection to the skin, while its alkali acts as an irritant. As a preliminary treatment, he advocates rubbing the feet with coarse, cheap Schnapps, or methylated spirit, as the skin is hardened thereby. The feet must then be greased before the socks are drawn on; and more grease may be plastered over the sock so liberally that it is felt to reach the skin at any specially sensitive place, such as the heel. "I have often entirely checked incipient abrasion," he says, "by taking off my boot and applying

grease liberally over the suspected spot. The grease used must be saltless and hard when cold. Lard or vaseline soon disappears. A week's supply of this hard grease may be kept in a tooth-powder box with a deep lid, in the pocket if the weather be cold, in the knapsack in warmer weather. I now use anhydrous lanoline, which is cheap and stiff. No doubt it could be combined with advantage with some fine, non-gritty boracic powder. But hard tallow does just as well, this becoming soft enough for application when the box is kept in an inner pocket. It is hardly worth while speaking of the use of the filmy 'sweat-absorbing' socks (price 1½d. a pair) used in Germany and Austria, for they could not well be obtained now. 'Spirits and pure hard grease,' and on no account soap, that is the secret that I learned as far back as the 'eighties.'—W. L." This eminently practical experience deserves to be widely diffused among our military surgeons.—*Medical Press.*

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The "Safety-First" Movement.—*American Medicine* reports that a comprehensive report is being prepared by the Goodyear Tire and Rubber Company of Akron, Ohio, to show the result of the first year of the "Safety-First" movement in the company's factory. The article states:

"Goodyear has had for several years a safety engineer, whose business it is to install safeguards for machines and make safe places found to be dangerous. It is interesting to note that when the safety movement was first begun Goodyear factory employees were skeptical and some of them regarded the whole proposition as a joke. But, so greatly have factory accidents been cut down in number that the skepticism is all gone and nearly all of the 7,500 workmen are aiding the movement heartily. They are helped in this by a series of suggestion boxes, in which employees are requested to drop written recommendations, etc., the valuable ideas being rewarded accordingly.

"Owing to the general interest in factory safety movements, it may be interesting to note how the Goodyear organization operates. First there is a central committee, with the assistant to factory manager as chairman, and a membership of nine men from various parts of the plant who have opportunities for getting about. They report regularly on dangerous conditions found, and each central committeeman is chairman of a division inspection committee, so the work is very thorough. One result is that only four out of the 307 men on the committees have been victims of injury, serious or otherwise.

"A new development of Goodyear welfare work is a school for foremen—two lessons a week for six months on Organization and Management. Other movements firmly established at Goodyear are lunch room, factory newspaper, library, labor department, hospital and police department, and fine results from all these movements for improving working conditions are reported on all sides."

Personal Notes.

The following were elected to membership in the American Public Health Association on August 13, 1915:

Thomas Verner Moore, M. D. Health Officer, Butte, Mont.

Irving Mochstadter, New York City. Bacteriological chemist.

Harry L. Roscoe, Kansas City, Mo. Dairy chemist.

Richard Stevens, Hoboken, N. J.

Frederick Almy, Buffalo, N. Y.

Miss Ellen W. Coolidge, Boston, Mass.

Hugo Jone, Brooklyn, N. Y. Food chemist and bacteriologist.

Garret Smith, Rochester, N. Y. Secretary, Rochester Public Health Association.

Dwight Irving Cooke, Chicago, Ill. Ventilating engineer.

James Austin Ellison, Wilmington, Del. Secretary, Board of Health.

Miss Annie B. Jennings, New York City.

Frank Clifton Tolles, Mt. Vernon, N. Y. Sanitary engineer.

Frederick W. Whitin, New York City.

Bleeker Van Wagenen, New York City.

Martin John Prucha, Assistant Professor, University of Illinois.

George A. Hastings, New York City. Sec-

retary, Committee on Mental Hygiene, State Charities Aid Association.

Wm. G. Kirschbaum. Health Officer, New Bedford, Mass.

Dr. Chas. G. Trembly. Health Officer, Saranac Lake, N. Y.

The following were elected to membership in the American Public Health Association on August 16, 1915:

Mrs. Philip North Moore, St. Louis, Mo.

William Shindel Bailey, Jamestown, N. Y. Editor, *The Nurse.*

Dr. Robert Law, Ottawa, Ont.

Dr. Otto Robert Eichel, State Health Department, Albany, N. Y.

Mantilla J. Fernando, City Engineer, San Juan, Porto Rico.

Dr. William Henry Rand, Washington, D. C.

Liston Paine, Victor, Mont. U. S. Public Health Service.

Michael M. Davis, Jr., Boston, Mass. Director, Boston Dispensary.

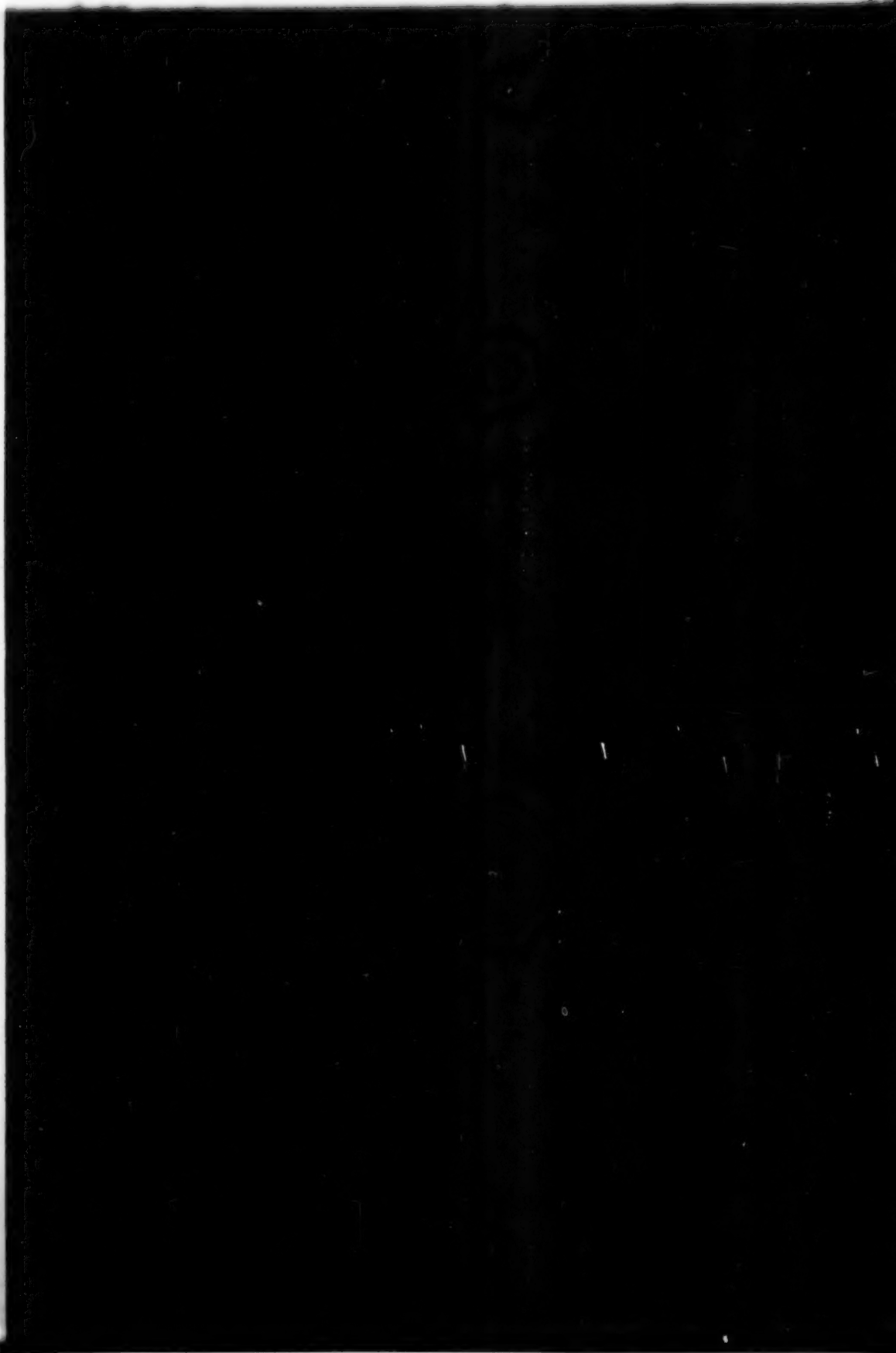
Miss Gertrude Seymour, New York, N. Y. Assistant editor, Health Department, *The Survey.*

Edgar B. Carter, Bacteriologist, Dallas, Tex.

Dr. I. Warner Knight, Somerton, Pa.

Wm. F. Cochran, Westbrook, Md.

Henry M. Lancaster, Toronto, Ont. Provincial chemist.

Dr. Samuel L. Jepson, Charleston, W. Va. State Commissioner of Health.

Dr. John L. Pomeroy, Los Angeles, Cal. City Health Officer.